

FIG.1

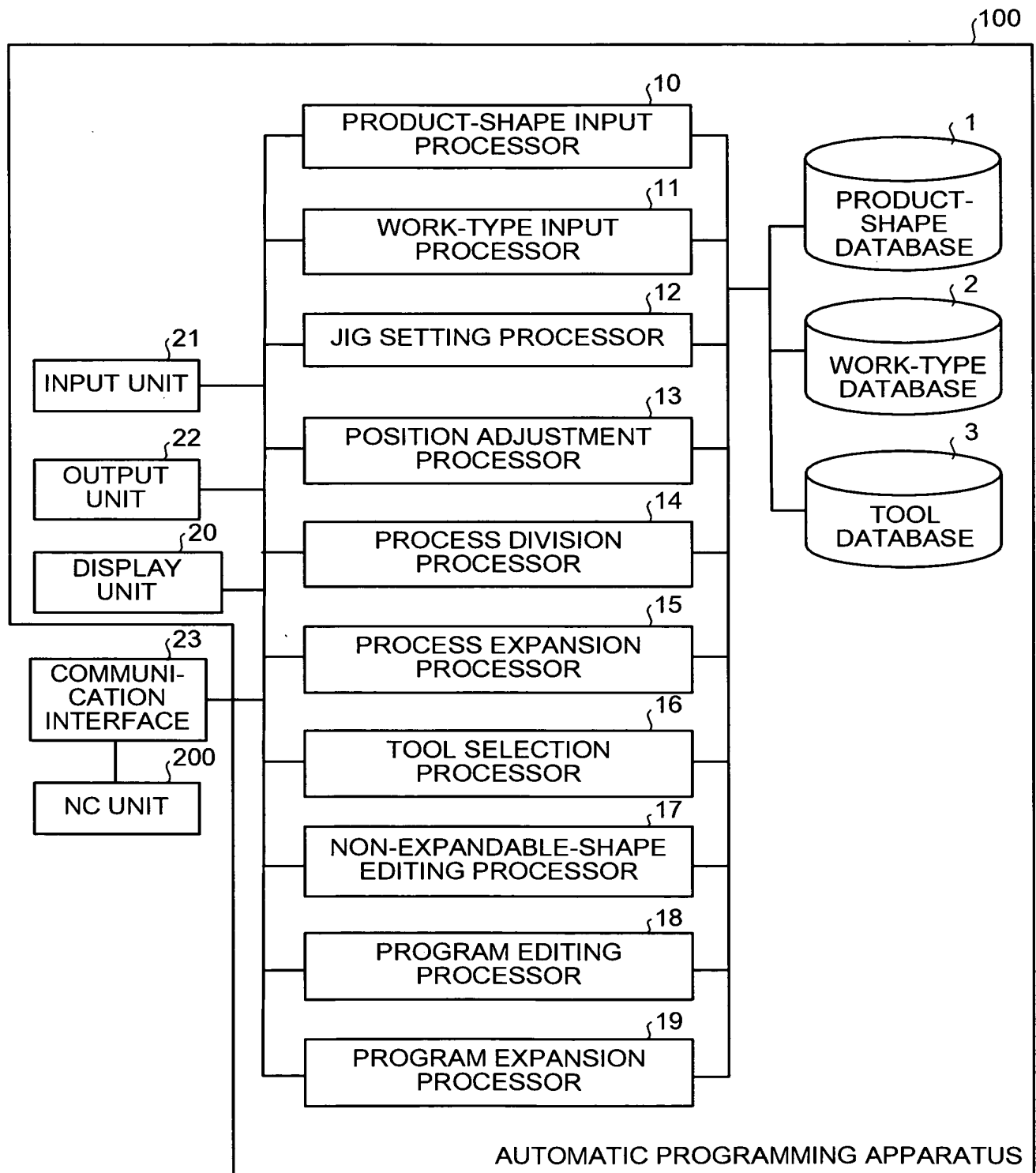
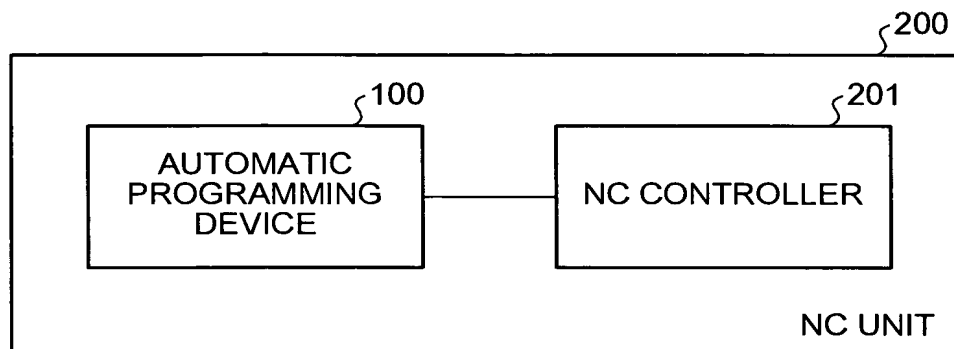


FIG.2



3/49

FIG.3

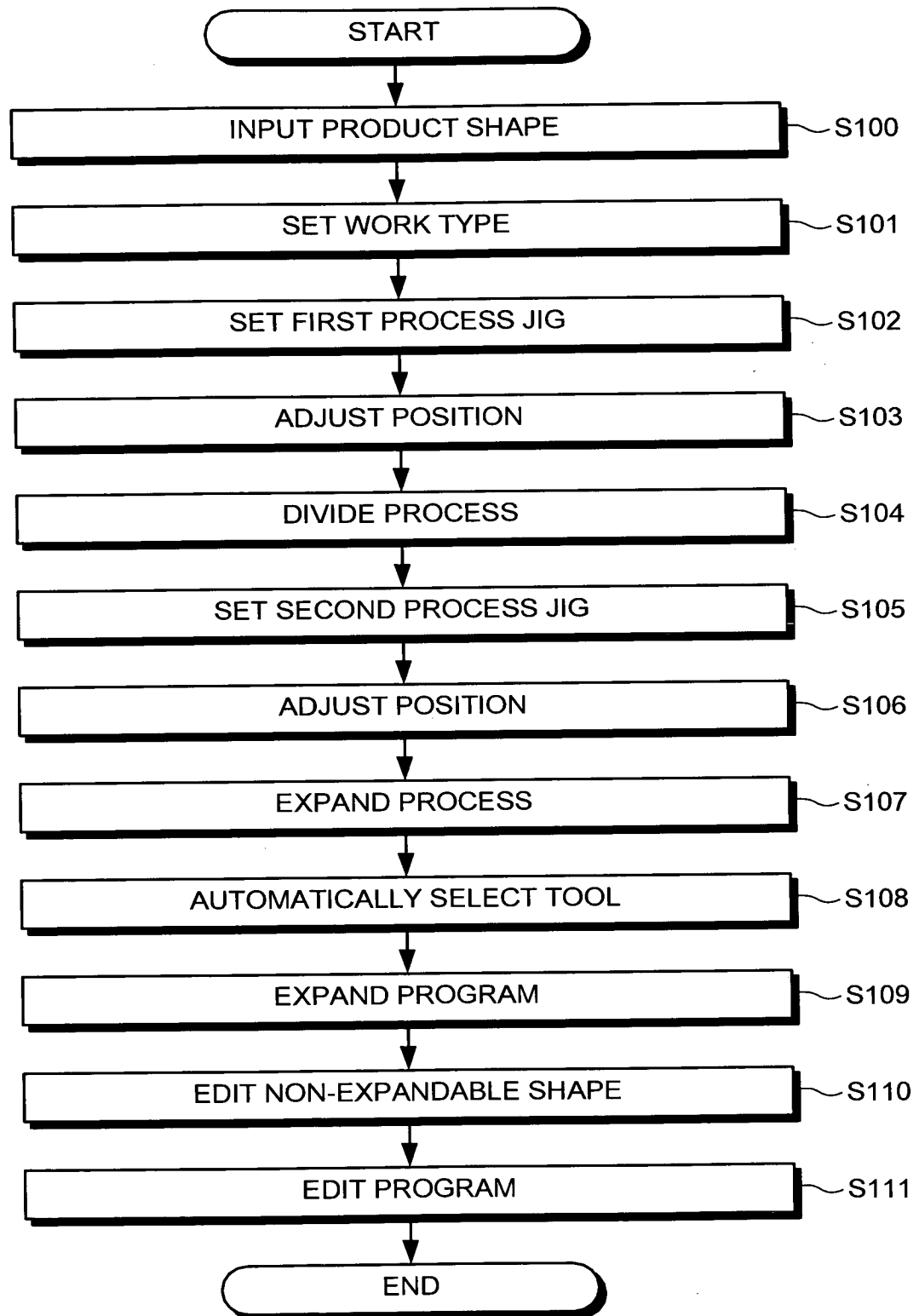


FIG. 4

MENU SELECTION MAIN SCREEN

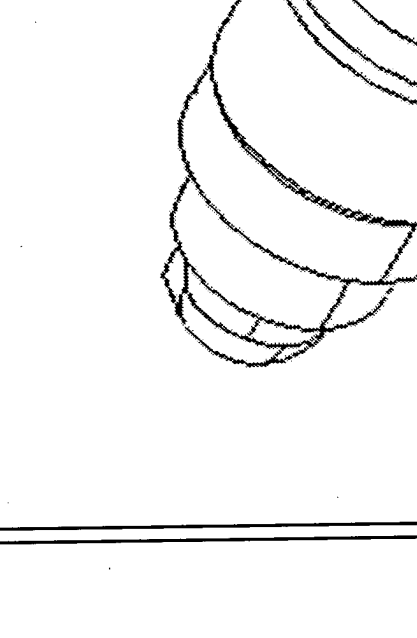
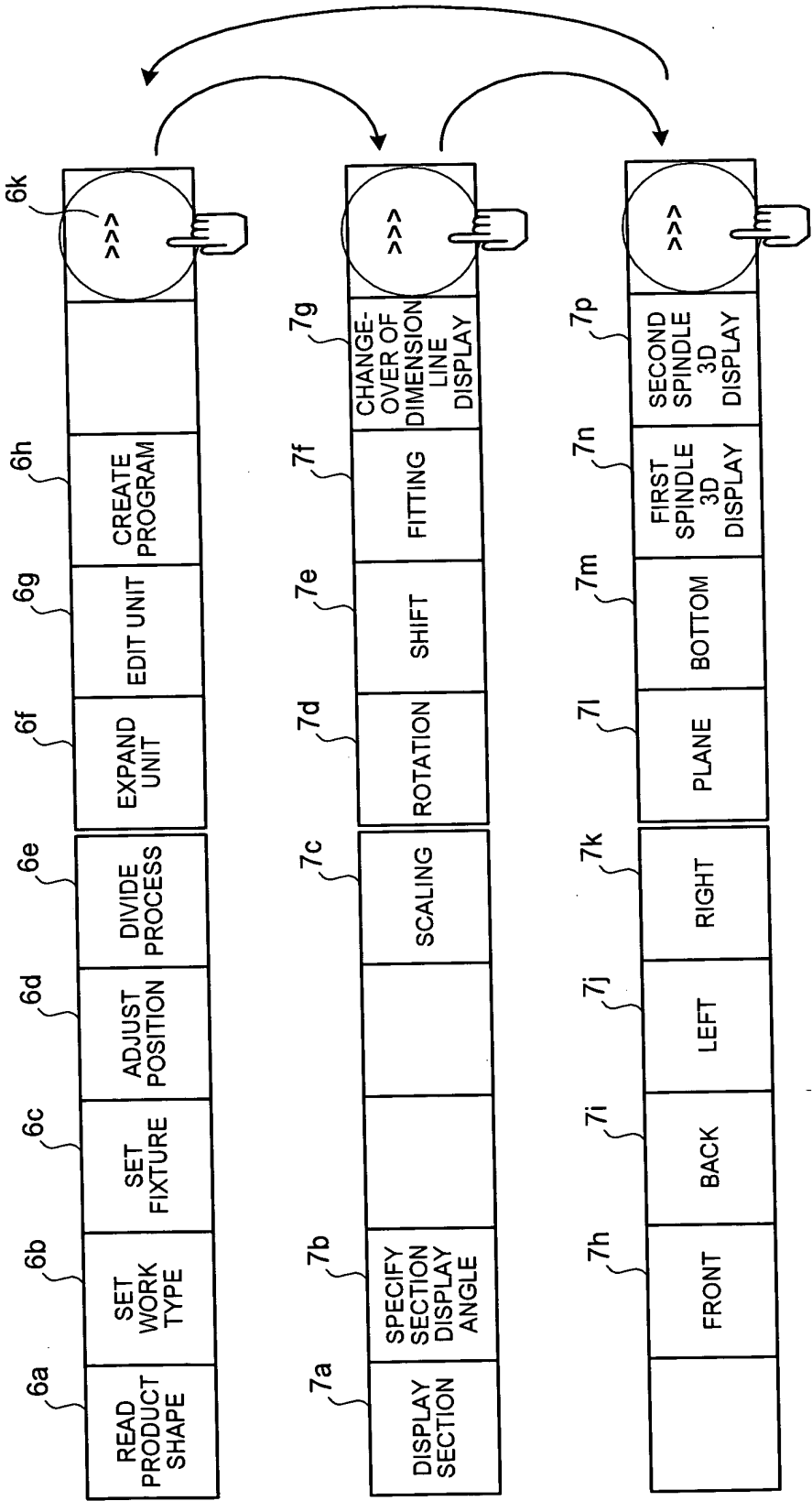
File(E) Help(H)								
<div style="border: 1px solid black; padding: 5px;"> 3D SHAPE PROGRAM </div> <div style="margin-top: 10px;"> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">3D SHAPE</div> <div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid black; padding: 2px; width: 45%;"> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">BASIC SHAPE</div> <div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid black; padding: 2px; width: 45%;"> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">PRODUCT SHAPE</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">WORK SHAPE</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">FIXTURE SHAPE</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">FIRST FIXTURE</div> </div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">FIRST PROCESS MACHINING SHAPE</div> </div> <div style="border: 1px solid black; padding: 2px; width: 50%;"> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">3 END FACE</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">4 TURNING DRILL</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">6 BAR</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">8 BAR</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">9 DRILL</div> </div> </div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">SECOND PROCESS MACHINING SHAPE</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">13 END FACE</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">14 TURNING DRILL</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">16 BAR</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">18 BAR</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">21 END MILL FACE</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">23 END MILL FACE</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">25 END MILL FACE</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">28 POCKET MILL</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">30 POCKET MILL</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">33 POCKET MILL</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">35 POCKET MILL</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">38 POCKET MILL</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">41 HOLE WITH WASHER</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">43 HOLE WITH WASHER</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">45 HOLE WITH WASHER</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">47 HOLE WITH WASHER</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">50 DRILL</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">52 DRILL</div> </div> </div>								
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 5px;">2D</div> <div style="border: 1px solid black; padding: 5px;">3D</div> </div>								
<div style="display: flex; justify-content: space-between; padding: 5px;"> <div style="border: 1px solid black; padding: 5px;">SET PRODUCT SHAPE</div> <div style="border: 1px solid black; padding: 5px;">SET WORK TYPE</div> <div style="border: 1px solid black; padding: 5px;">SET FIXTURE</div> <div style="border: 1px solid black; padding: 5px;">ADJUST POSITION</div> <div style="border: 1px solid black; padding: 5px;">DIVIDE PROCESS</div> <div style="border: 1px solid black; padding: 5px;">EXPAND UNIT</div> <div style="border: 1px solid black; padding: 5px;">EDIT UNIT</div> <div style="border: 1px solid black; padding: 5px;">CREATE PROGRAM</div> </div>								
<div style="display: flex; justify-content: space-between; padding: 5px;"> <div style="border: 1px solid black; padding: 5px;">100%</div> <div style="border: 1px solid black; padding: 5px;">100%</div> <div style="border: 1px solid black; padding: 5px;">100%</div> <div style="border: 1px solid black; padding: 5px;">100%</div> </div>								
6a	6b	6c	6d	6e	6f	6g	6h	6k

FIG.5



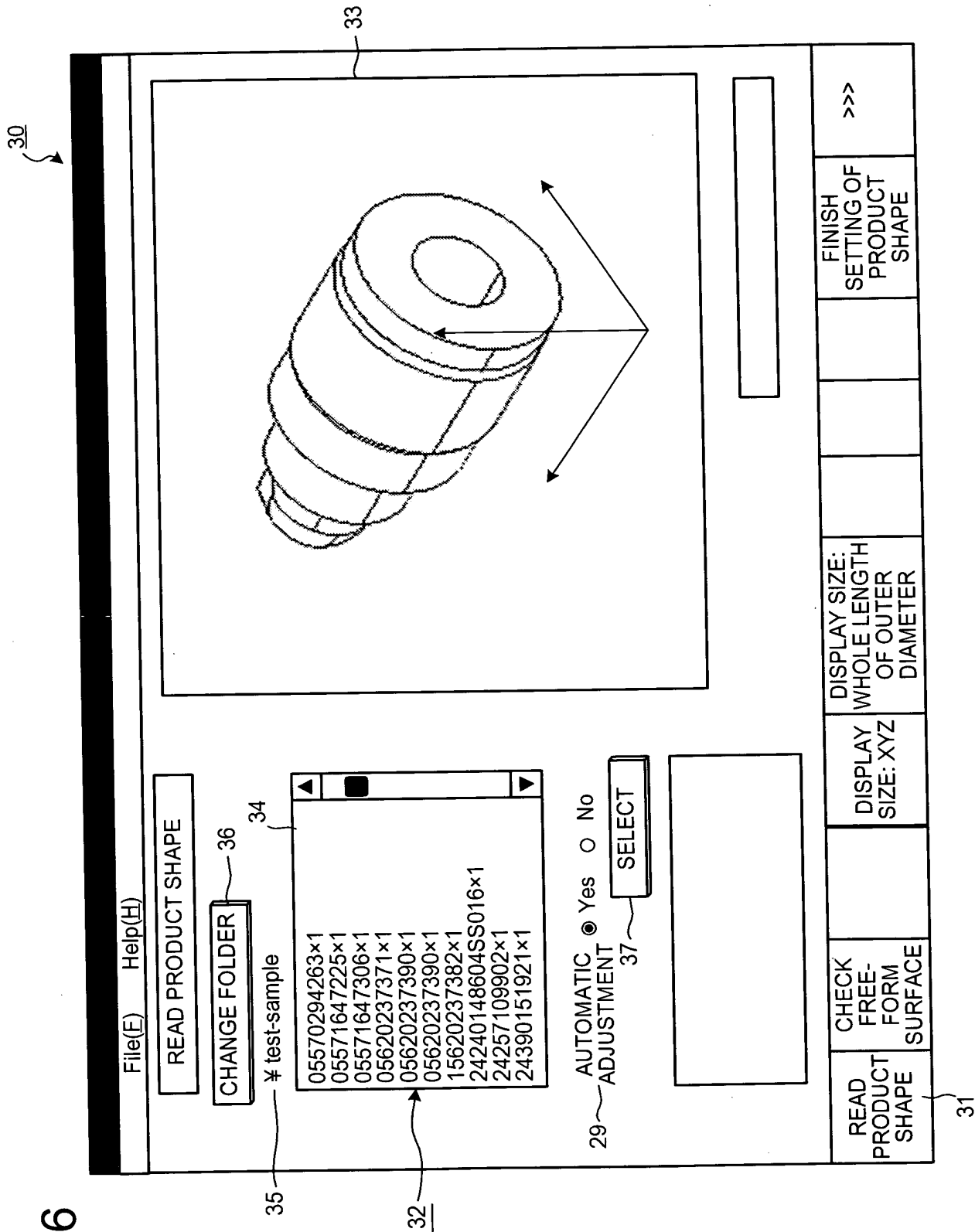


FIG.7

9

9a

9b

9c

9d

9e

9f

9g

WORK DATABASE

SET PARTIAL WORK

READ WORK MODEL

SET WORK MATERIAL

EDIT

CHANGE MACHINING ALLOWANCE

WORK TYPE SETTING

PRODUCT SHAPE

X 100 Y 100 Z 100

No.	WORK MATERIAL	TYPE	OUTER DIAMETER	INNER DIAMETER	LENGTH
1	A7075	ROUND BAR	110.000	0.000	130.000
2	A5056	ROUND BAR	110.000	0.000	130.000
3	A7075	ROUND BAR	120.000	0.000	130.000
4	A5056	ROUND BAR	120.000	0.000	130.000
5	CBN STL	ROUND BAR	120.000	0.000	130.000
6	STNLESS	ROUND BAR	130.000	0.000	130.000
7	STNLESS	ROUND BAR	140.000	0.000	130.000
8	A7075	ROUND BAR	150.000	10.000	130.000
9	A7075	ROUND BAR	150.000	10.000	130.000
10	A7075	ROUND BAR	150.000	10.000	130.000
11	A7075	ROUND BAR	150.000	10.000	130.000
12	A5056	ROUND BAR	120.000	0.000	130.000

301

303

300

302

304

3

OK

WORK TYPE SETTING

No. 3

WORK MATERIAL A7075

WORK TYPE ROUND BAR

OUTER DIAMETER 120

INNER DIAMETER 0

LENGTH 130

END-FACE MACHINING ALLOWANCE 0

OK

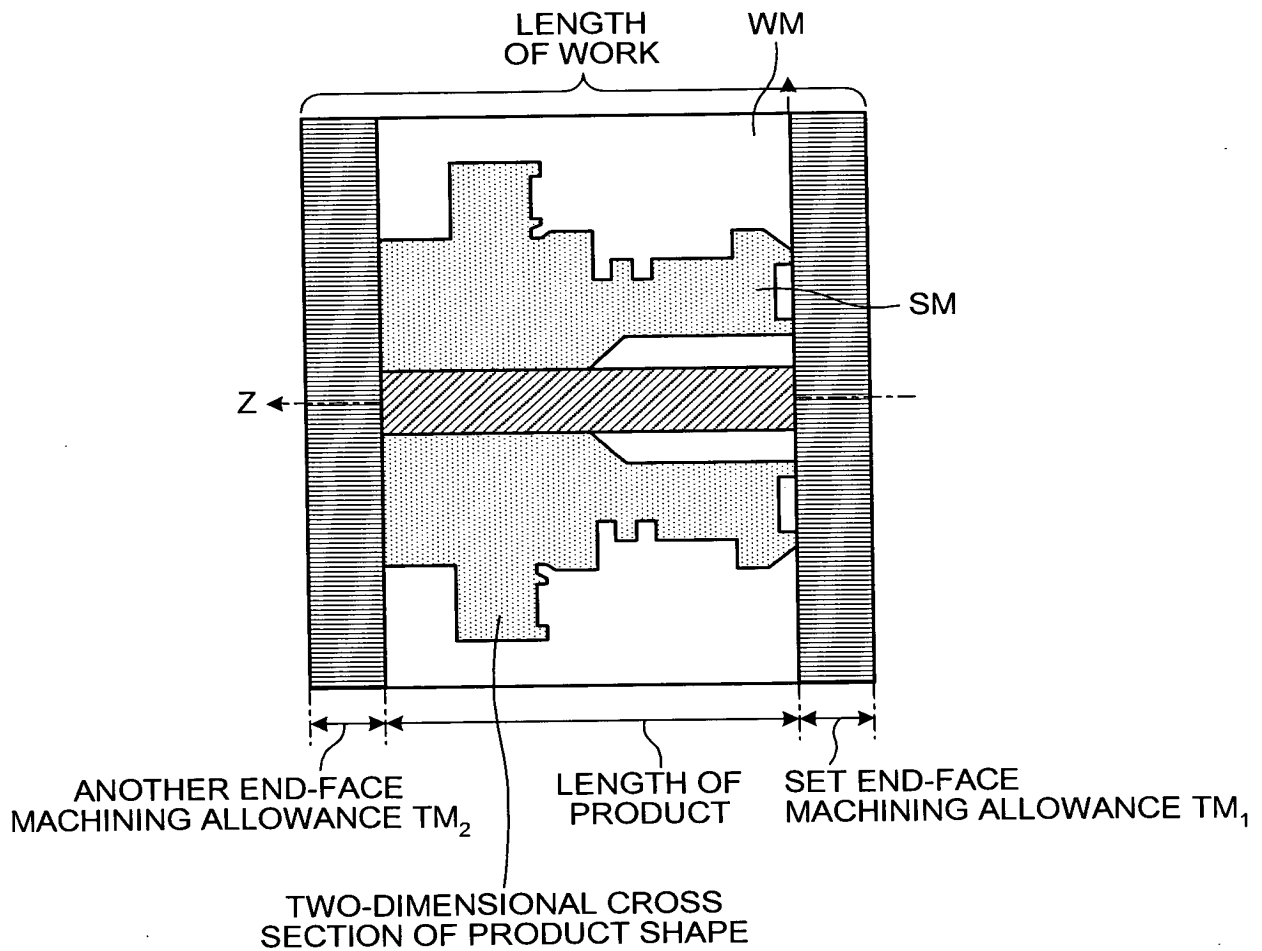
FIG.8

WORK SHAPE

MATERIAL	TYPE	OUTER DIAMETER	INNER DIAMETER
CBN STL	Cylinder	250	20	
CBN STL	Cylinder	250	30	
CBN STL	Cylinder	250	40	
CBN STL	Cylinder	250	50	
CBN STL	Cylinder	400		
CBN STL	Cylinder	400	30	
CBN STL	Cylinder	500		
CBN STL	Cylinder	800	70	
CBN STL	Cylinder	800	100	
CBN STL	Hexagon	300		
CBN STL	Hexagon	300		
CBN STL	Hexagon	400		

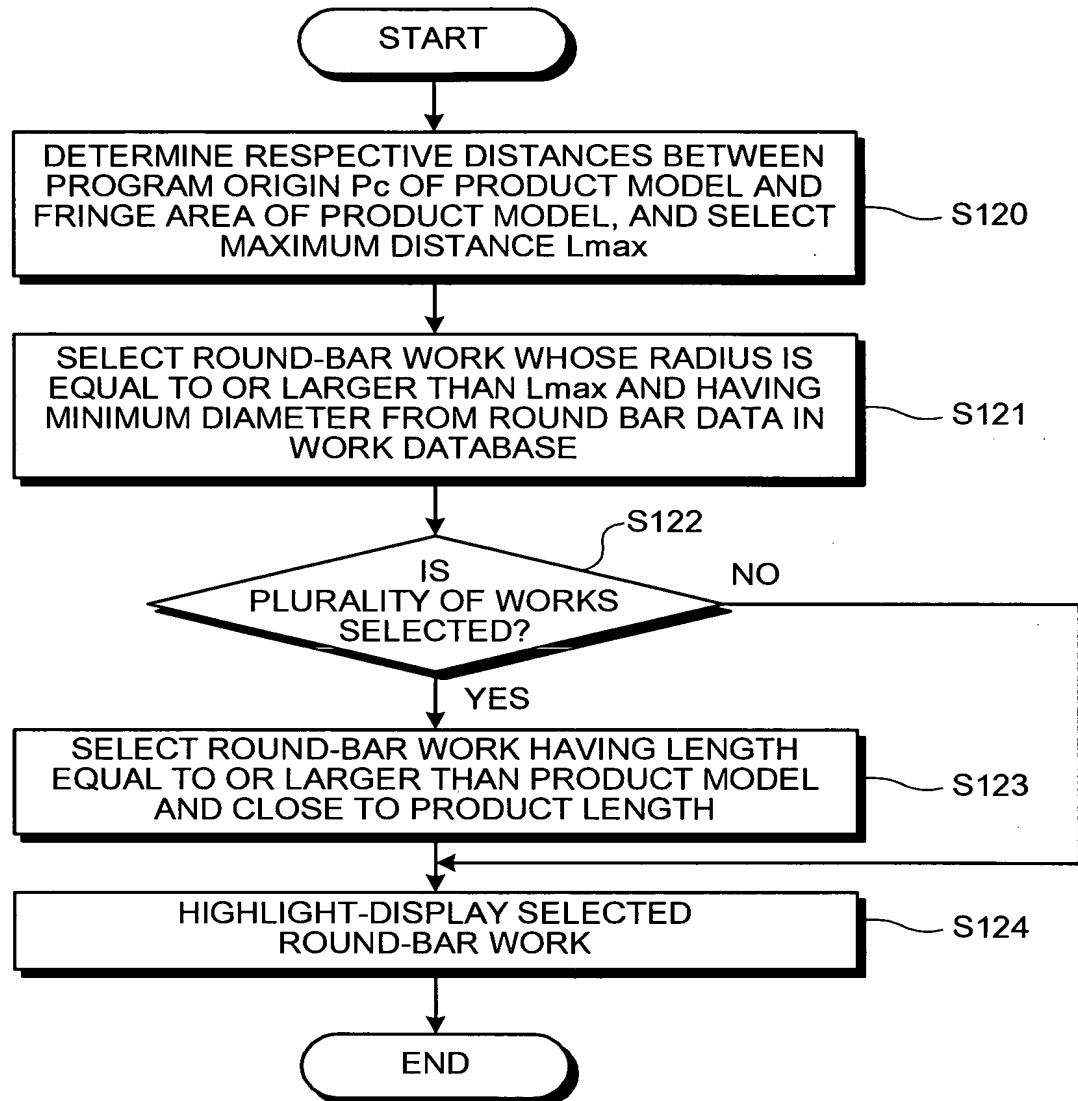
9/49

FIG.9

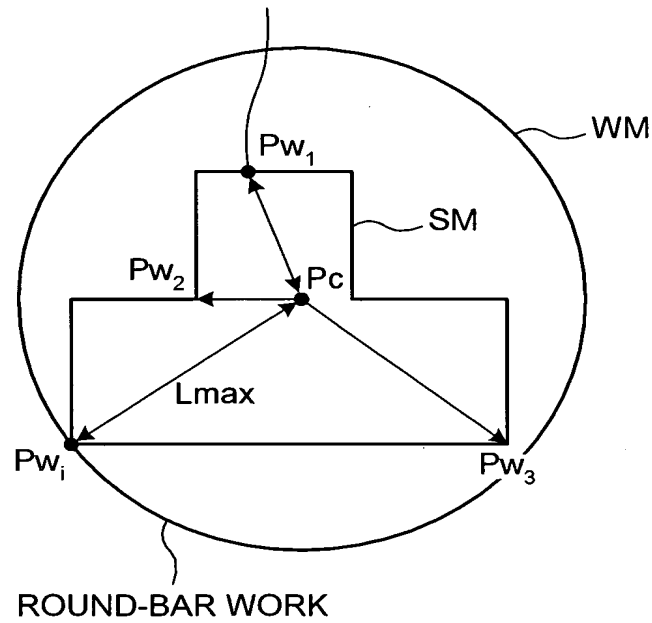


10/49

FIG.10



POINT ON PRODUCT SHAPE



12/49

FIG.12

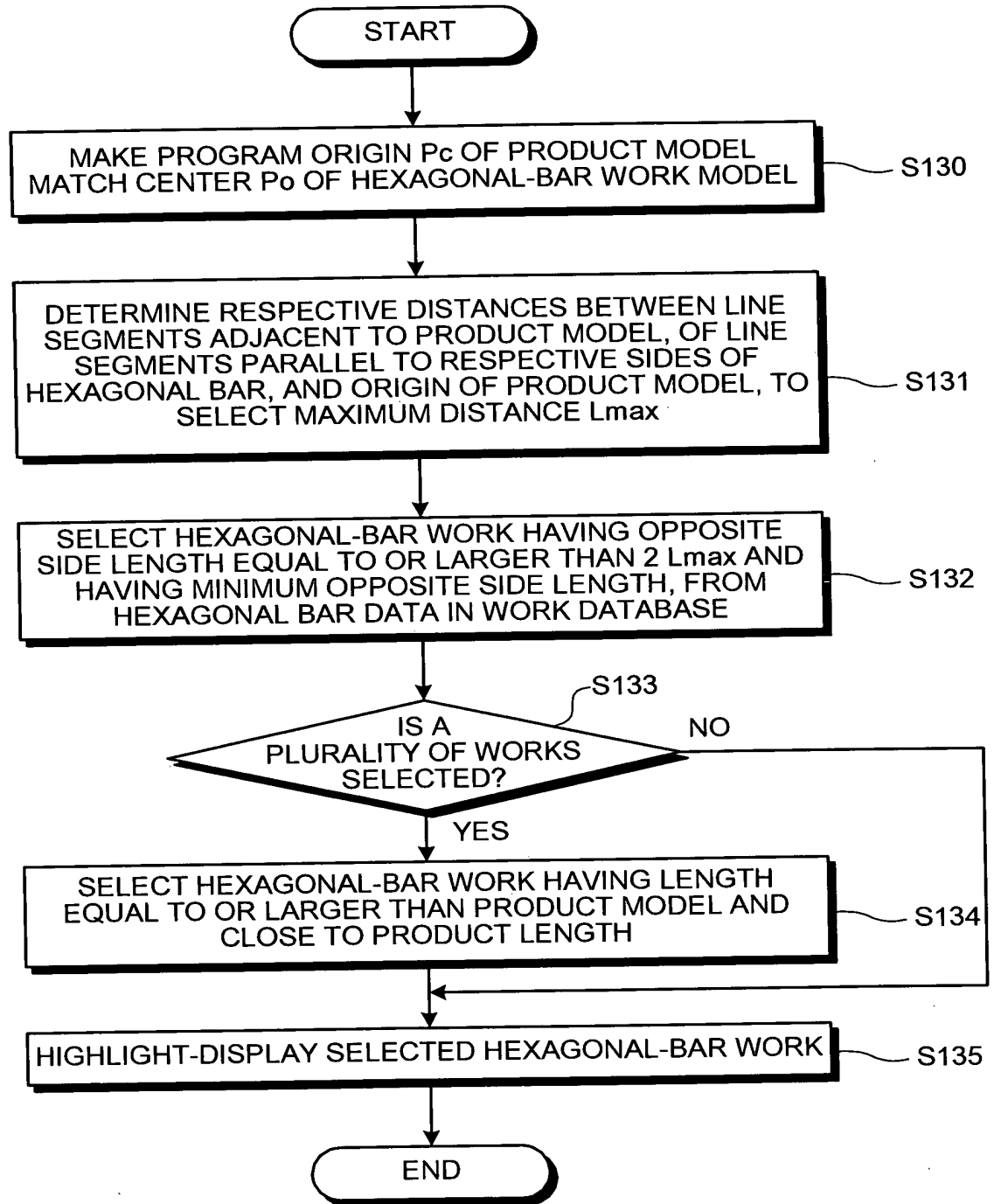


FIG.13

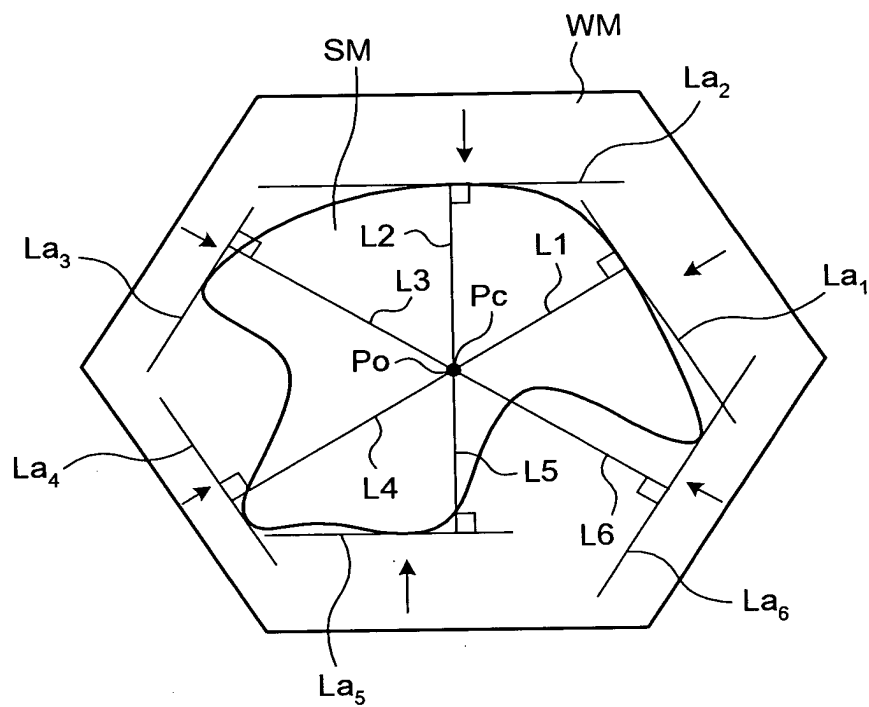


FIG.14

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9a

9b

9c

9d

9e

9f

9g

WORK DATABASE

SET PARTIAL WORK

READ WORK MODEL

SET WORK MATERIAL

EDIT

CHANGE MACHINING ALLOWANCE

WORK TYPE SETTING

PRODUCT SHAPE

X 100 Y 100 Z 100

No.	WORK MATERIAL	TYPE	OUTER DIAMETER	INNER DIAMETER	LENGTH
3	A7075	ROUND BAR	120.000	0.000	130.000
9	A5056	ROUND BAR	120.000	0.000	140.000
100	CBN STL	ROUND BAR	120.000	0.000	150.000
5	STNLESS	ROUND BAR	130.000	0.000	130.000
15	STNLESS	ROUND BAR	140.000	0.000	130.000
20	A7075	ROUND BAR	150.000	10.000	130.000
23	A7075	ROUND BAR	150.000	10.000	160.000
91	A7075	ROUND BAR	150.000	10.000	160.000
94	A7075	ROUND BAR	150.000	10.000	170.000

301

303

300

302

304

3

OK

WORK TYPE SETTING

No. 3

WORK MATERIAL A7075

WORK TYPE ROUND BAR

OUTER DIAMETER 120

INNER DIAMETER 0

LENGTH 130

END-FACE MACHINING ALLOWANCE 0

OK

15/49

FIG.15

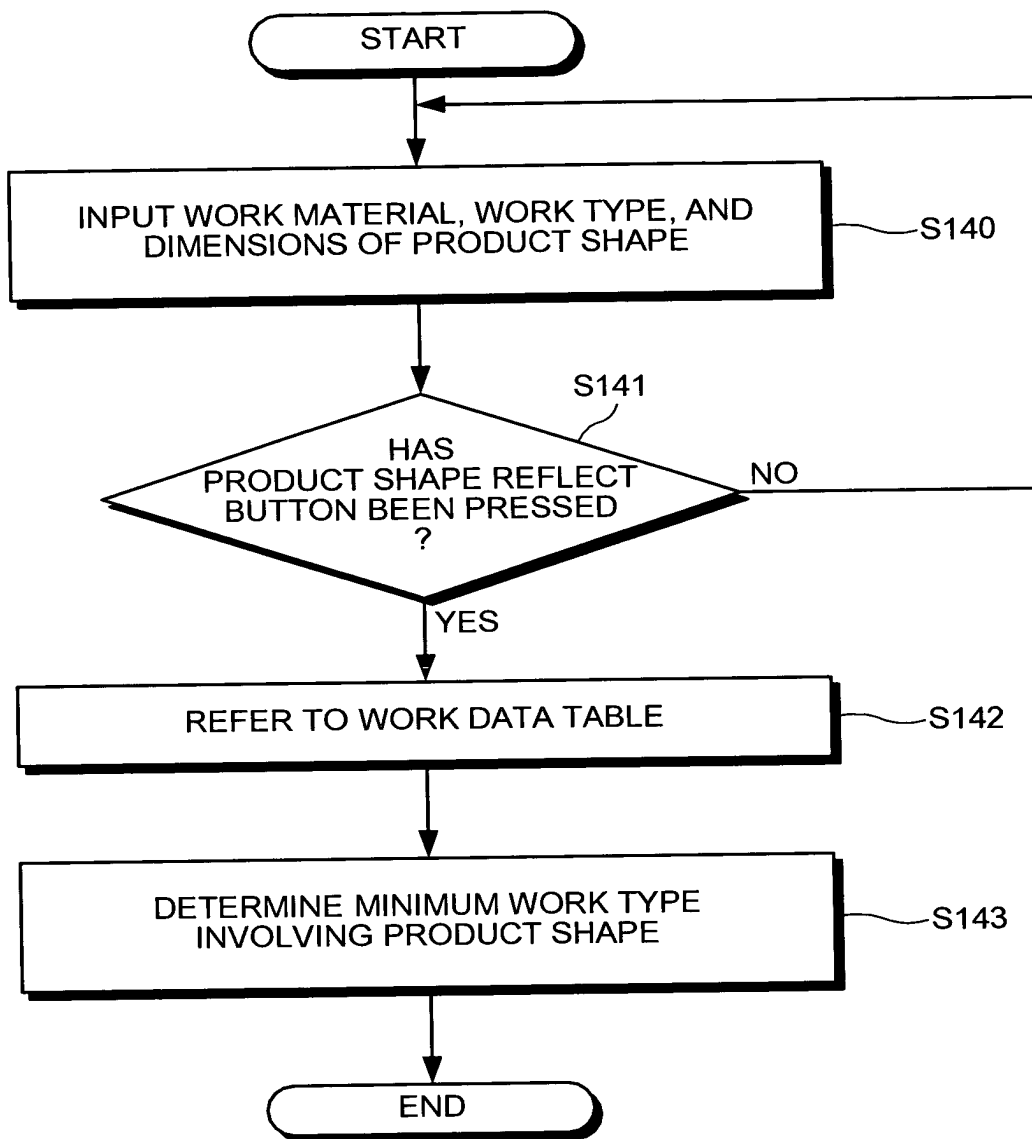


FIG.16

40

43

42

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41

58

WORK TYPE SETTING

REFLECT PRODUCT SHAPE

PRODUCT SHAPE

X 180

Y 180

Z 150

WORK MATERIAL CBN STL

WORK TYPE ROUND BAR

OUTER DIAMETER 254.5584

INNER DIAMETER 0

LENGTH 150

END-FACE MACHINING ALLOWANCE 0

CREATE

CBN STL	ROUND BAR	OUTER DIAMETER	250.0	INNER DIAMETER	20.0
CBN STL	ROUND BAR	OUTER DIAMETER	250.0	INNER DIAMETER	30.0
CBN STL	ROUND BAR	OUTER DIAMETER	250.0	INNER DIAMETER	40.0
CBN STL	ROUND BAR	OUTER DIAMETER	250.0	INNER DIAMETER	50.0
CBN STL	ROUND BAR	OUTER DIAMETER	400.0	INNER DIAMETER	0.0
CBN STL	ROUND BAR	OUTER DIAMETER	400.0	INNER DIAMETER	30.0
CBN STL	ROUND BAR	OUTER DIAMETER	500.0	INNER DIAMETER	0.0
CBN STL	ROUND BAR	OUTER DIAMETER	800.0	INNER DIAMETER	70.0
CBN STL	ROUND BAR	OUTER DIAMETER	800.0	INNER DIAMETER	100.0

FIG.17

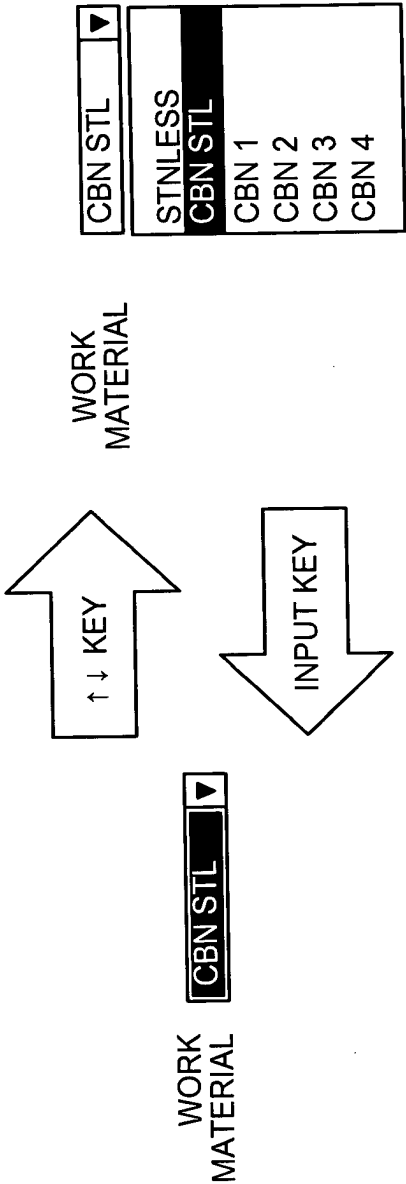
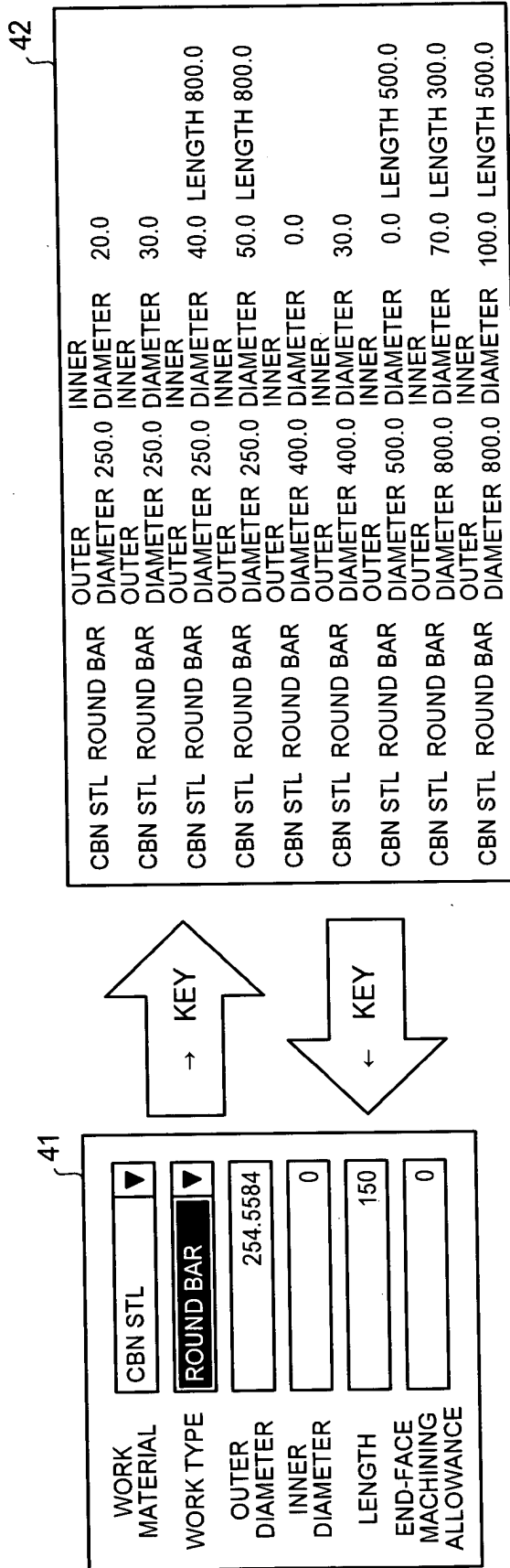


FIG.18



19/49

FIG.19

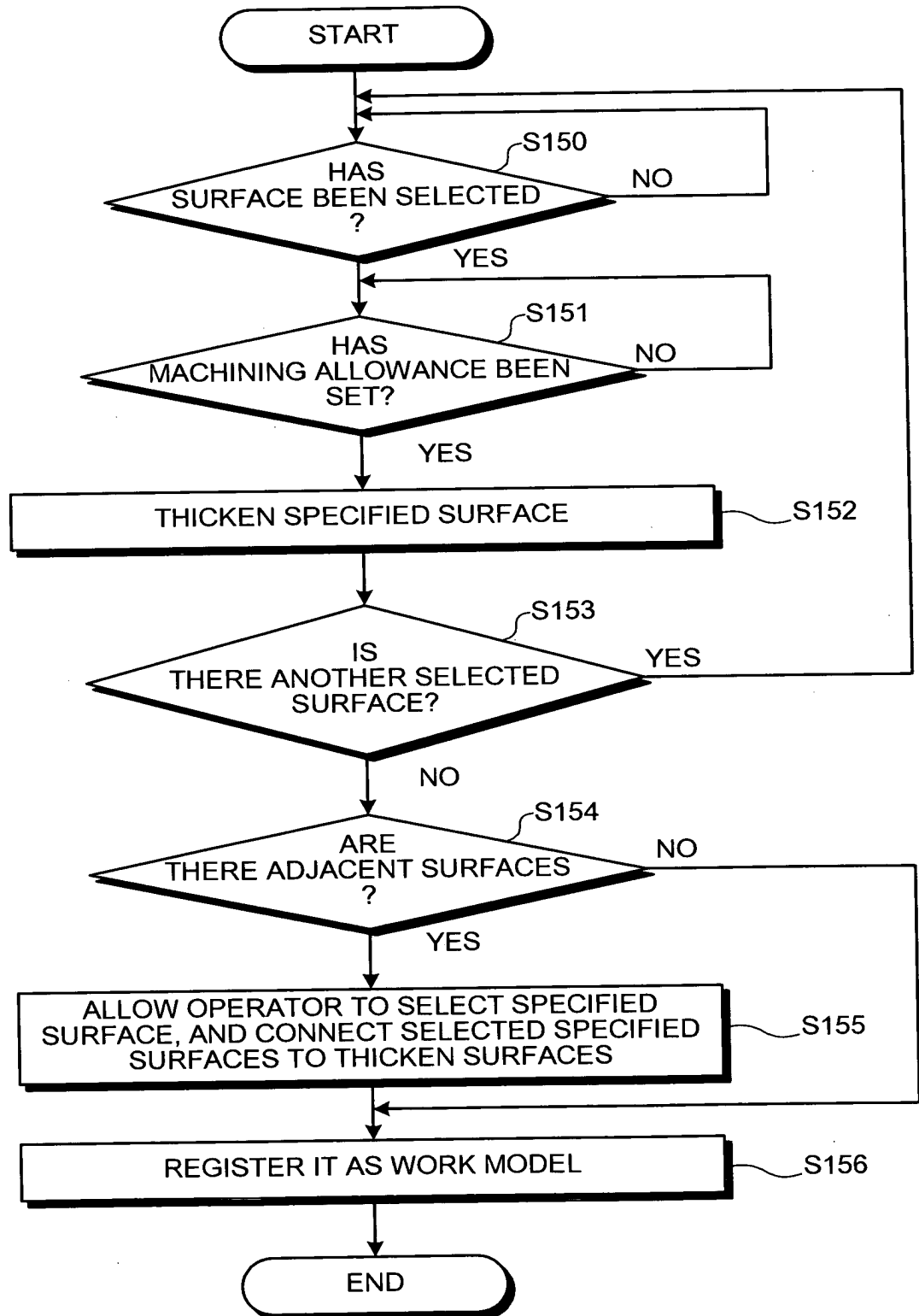
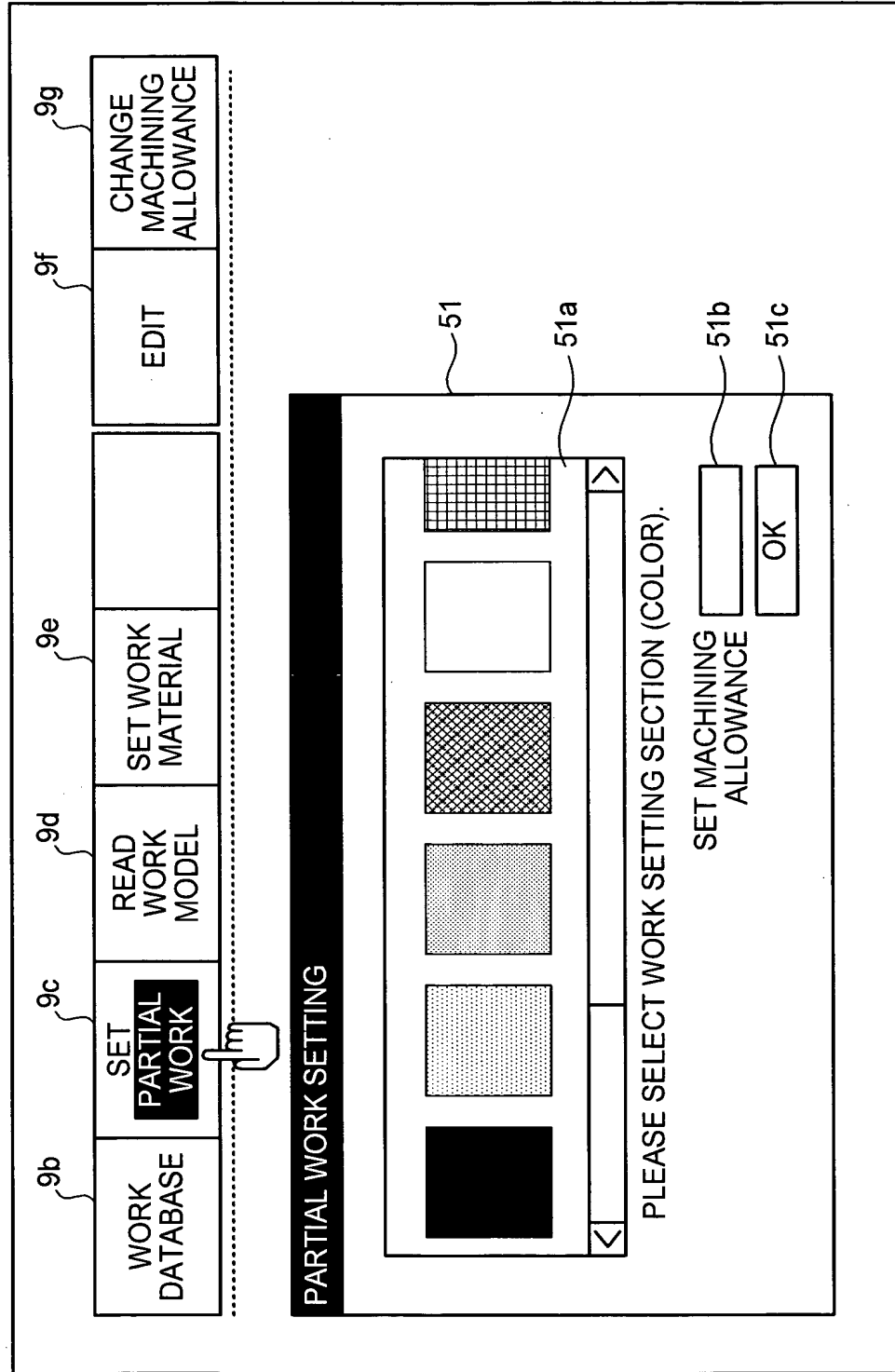


FIG.20



21/49

FIG.21

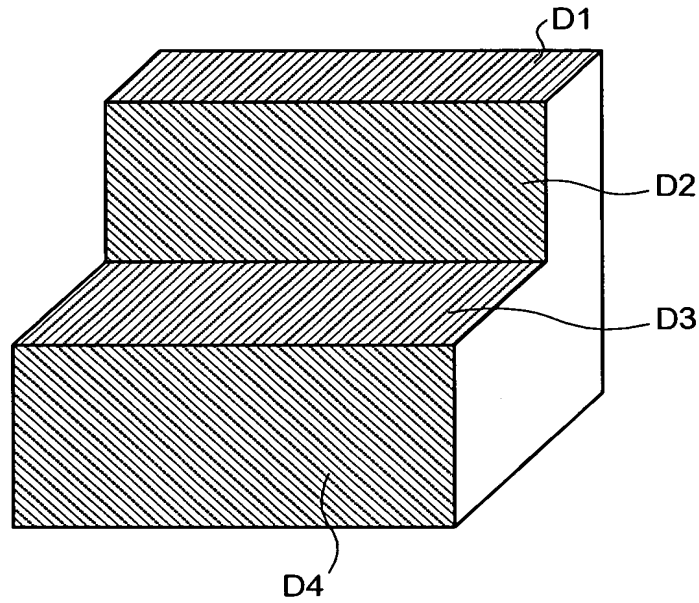
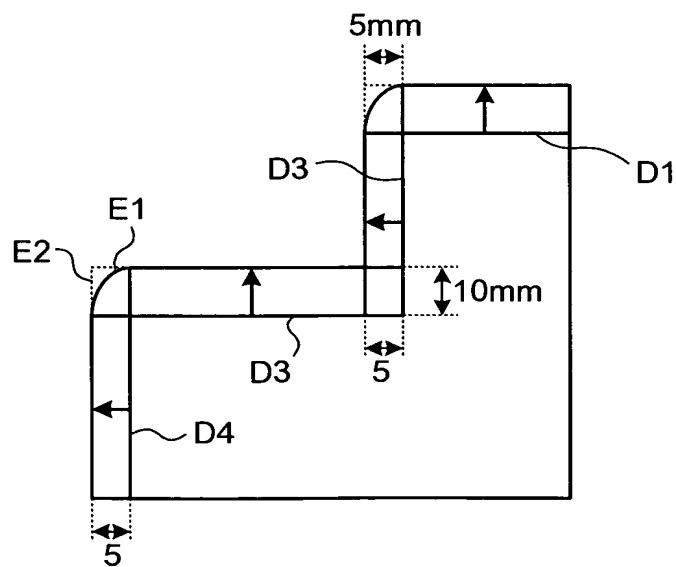


FIG.22



22/49

FIG.23

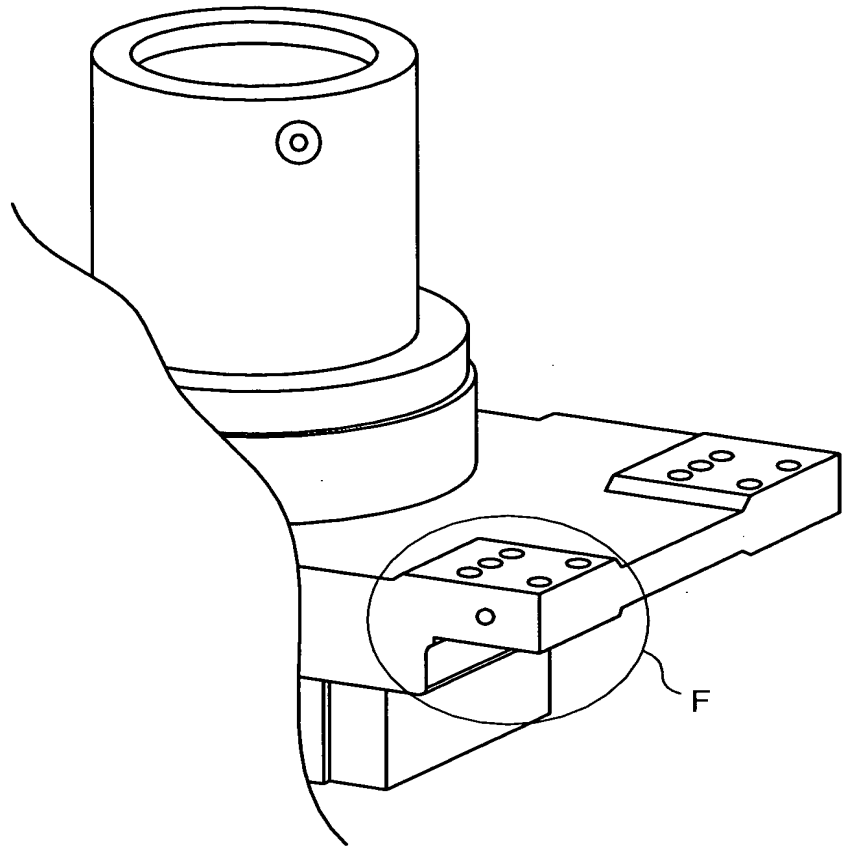


FIG.24

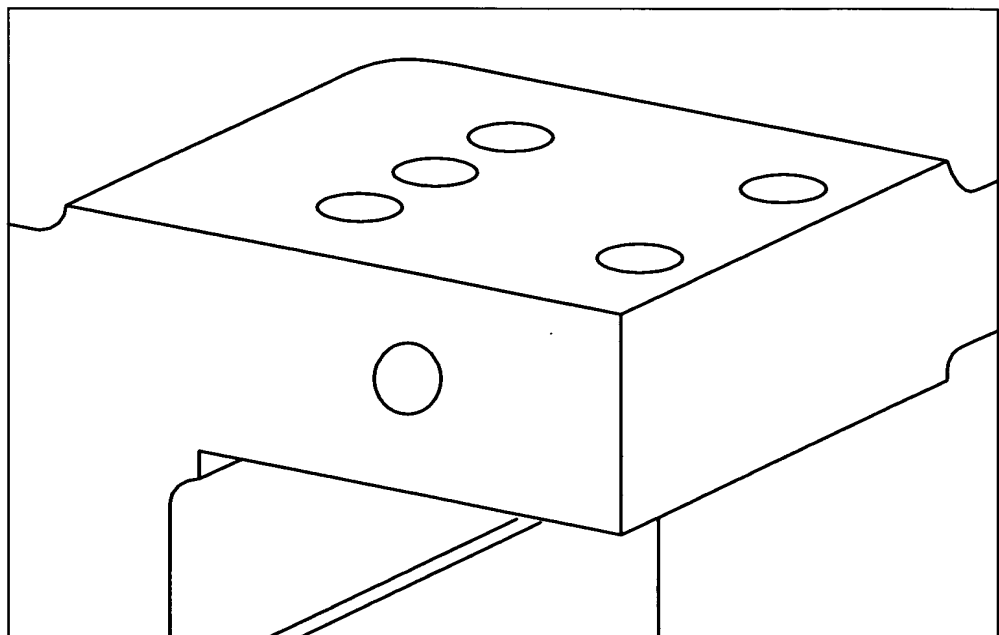


FIG.25

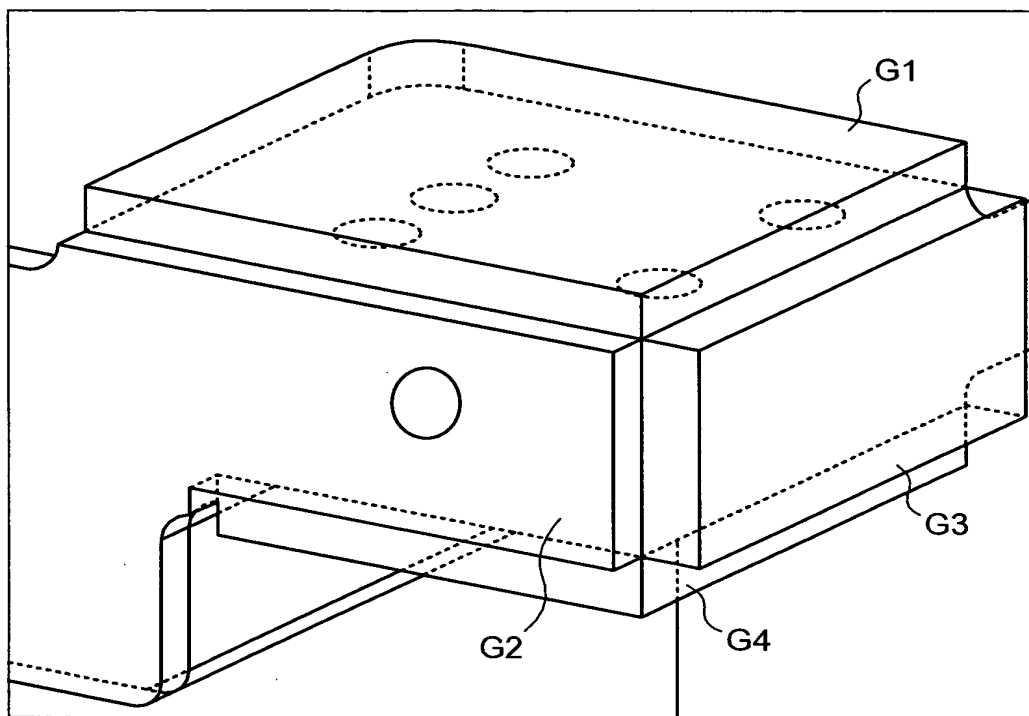


FIG.26

52

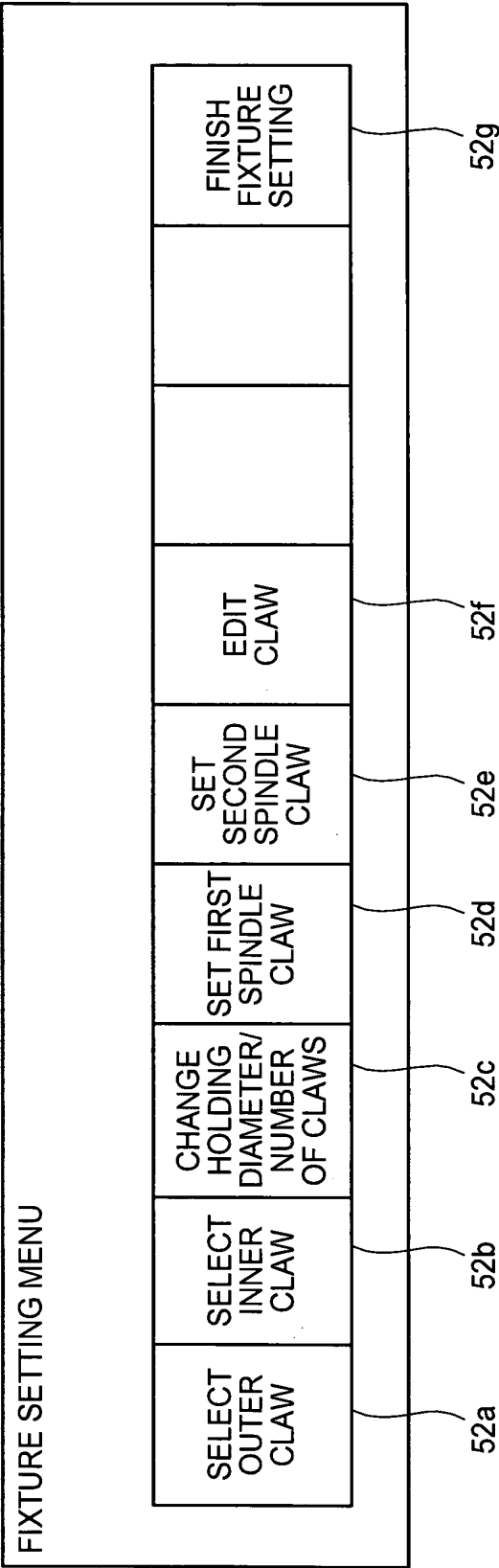


FIG.27

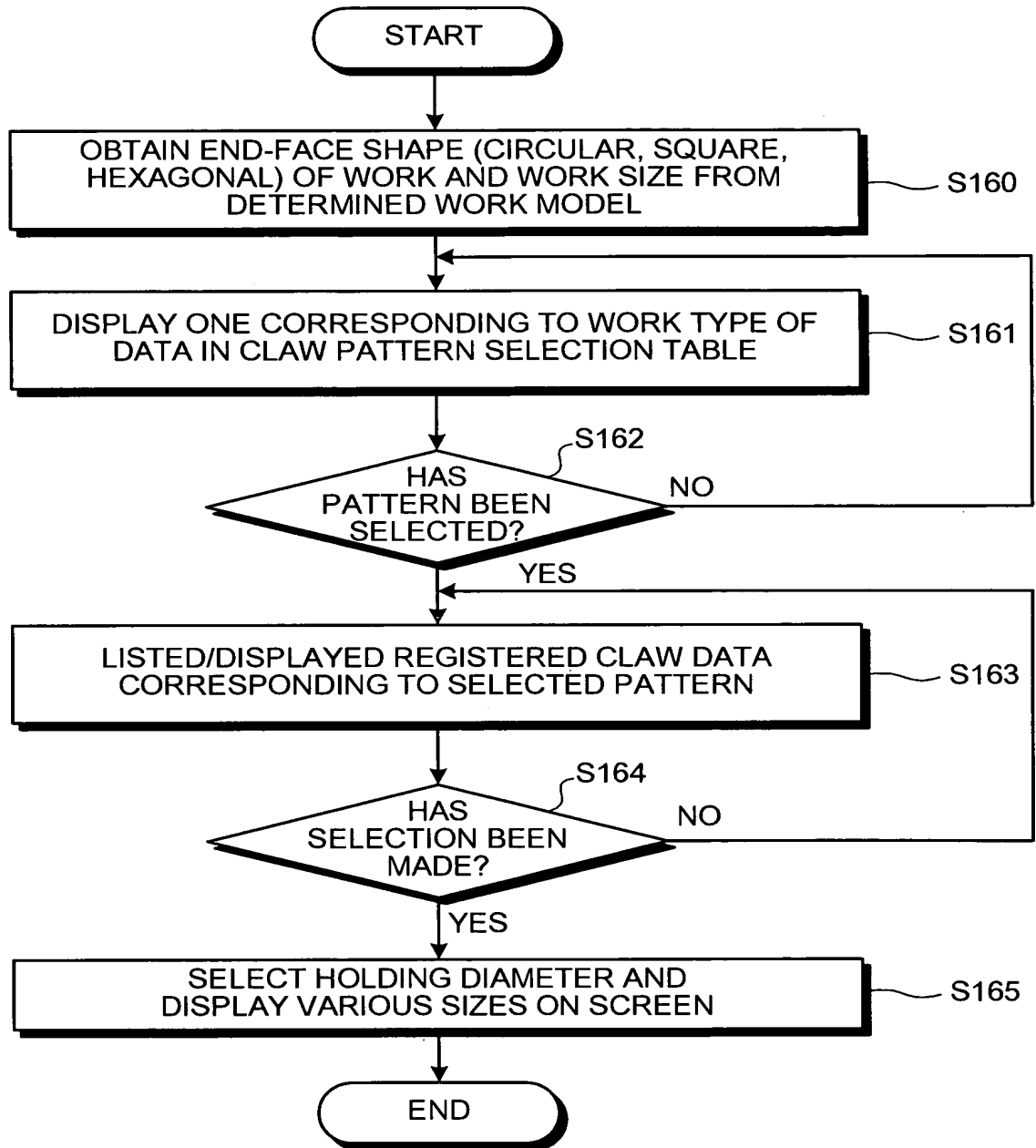
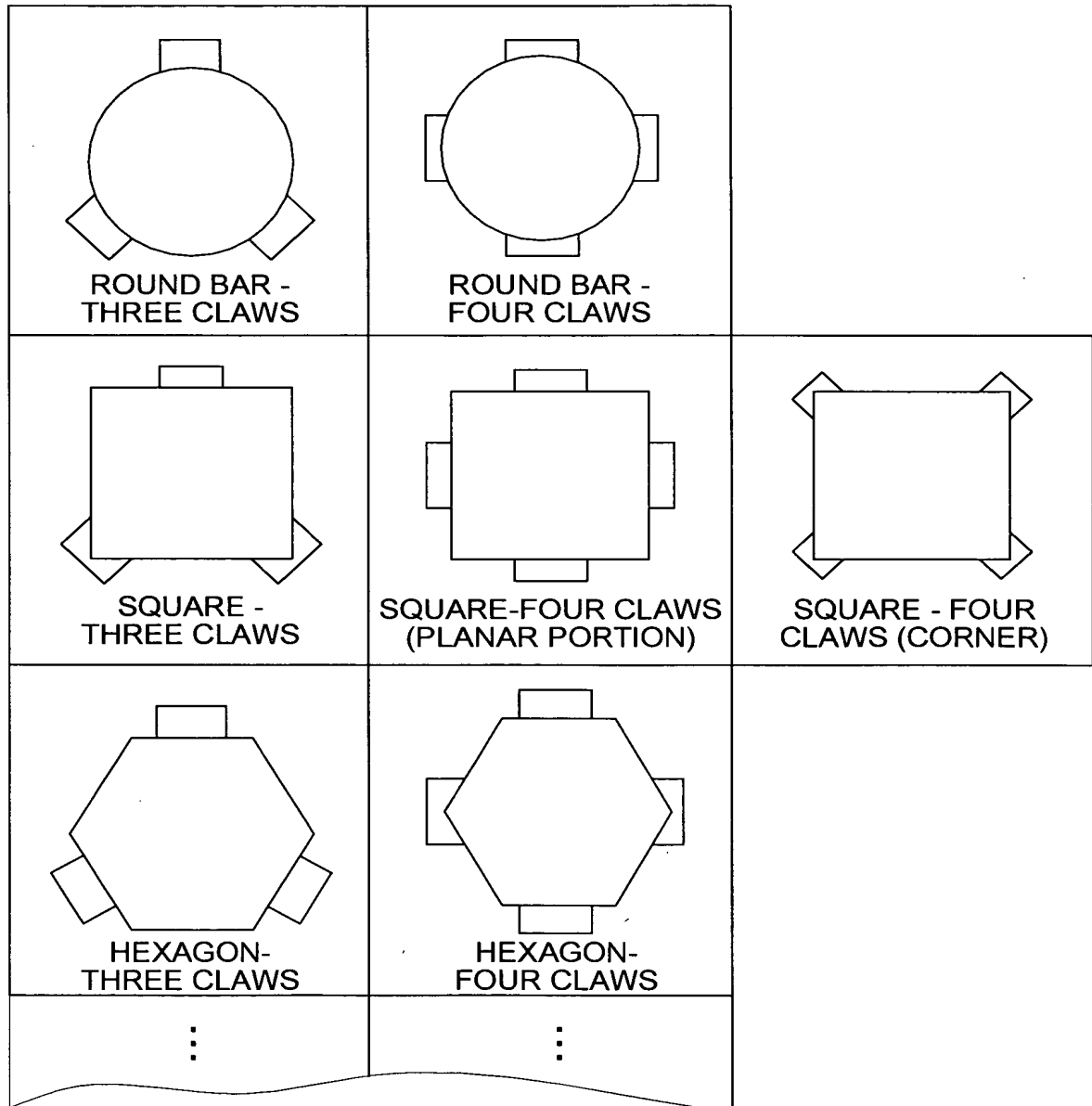


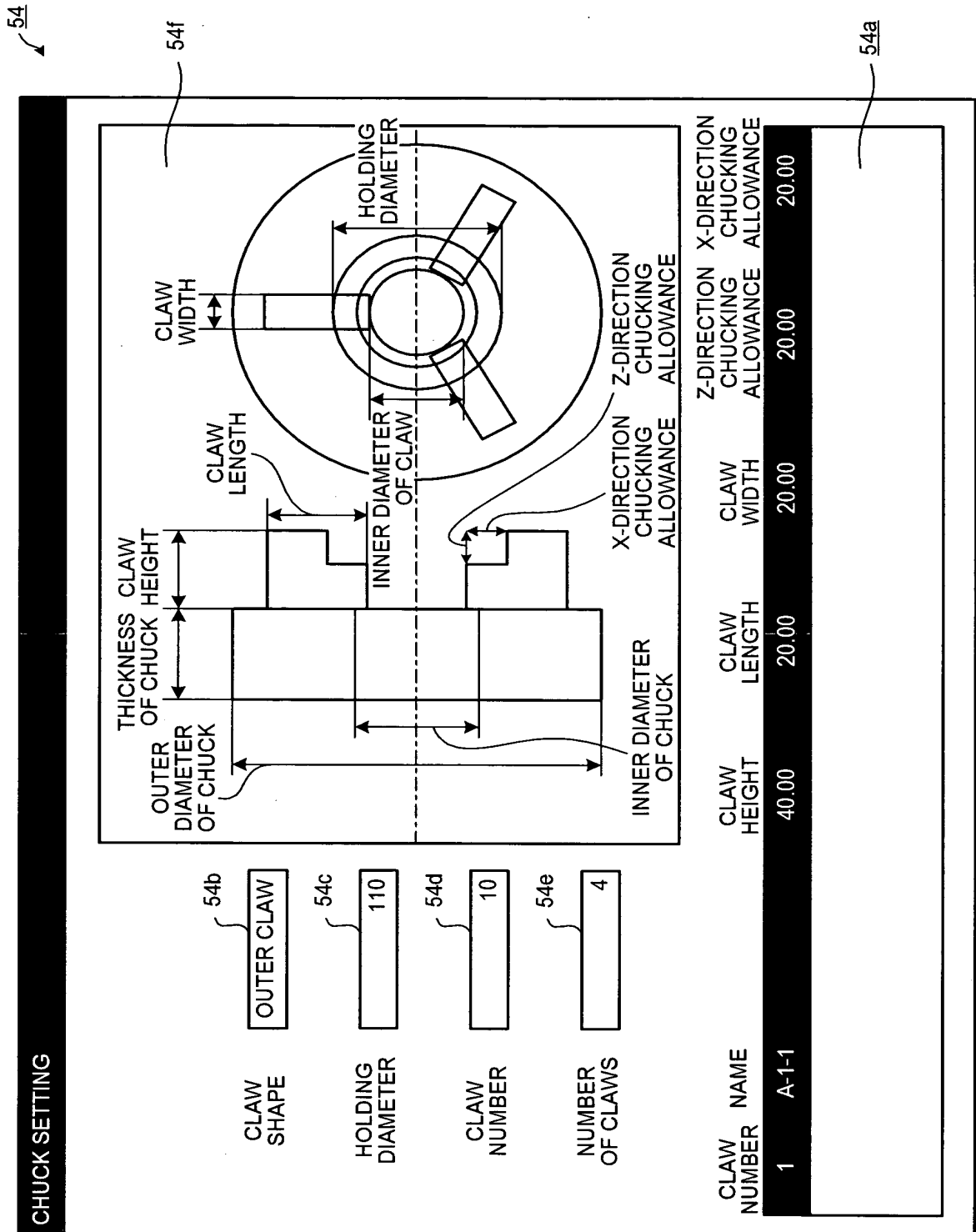
FIG.28

53

27/49

FIG.29



28/49

FIG.30

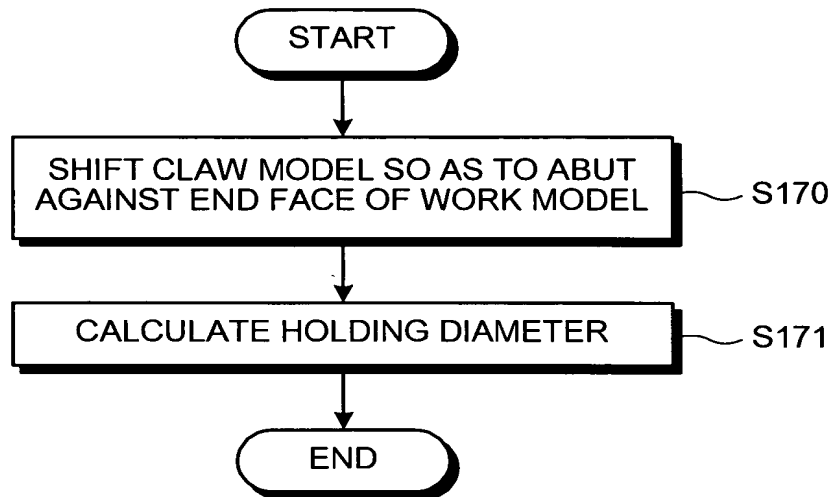
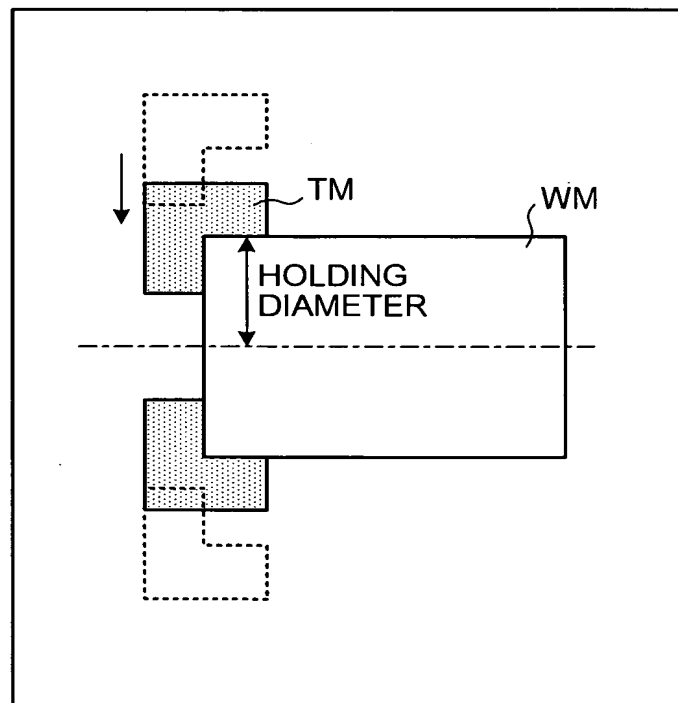
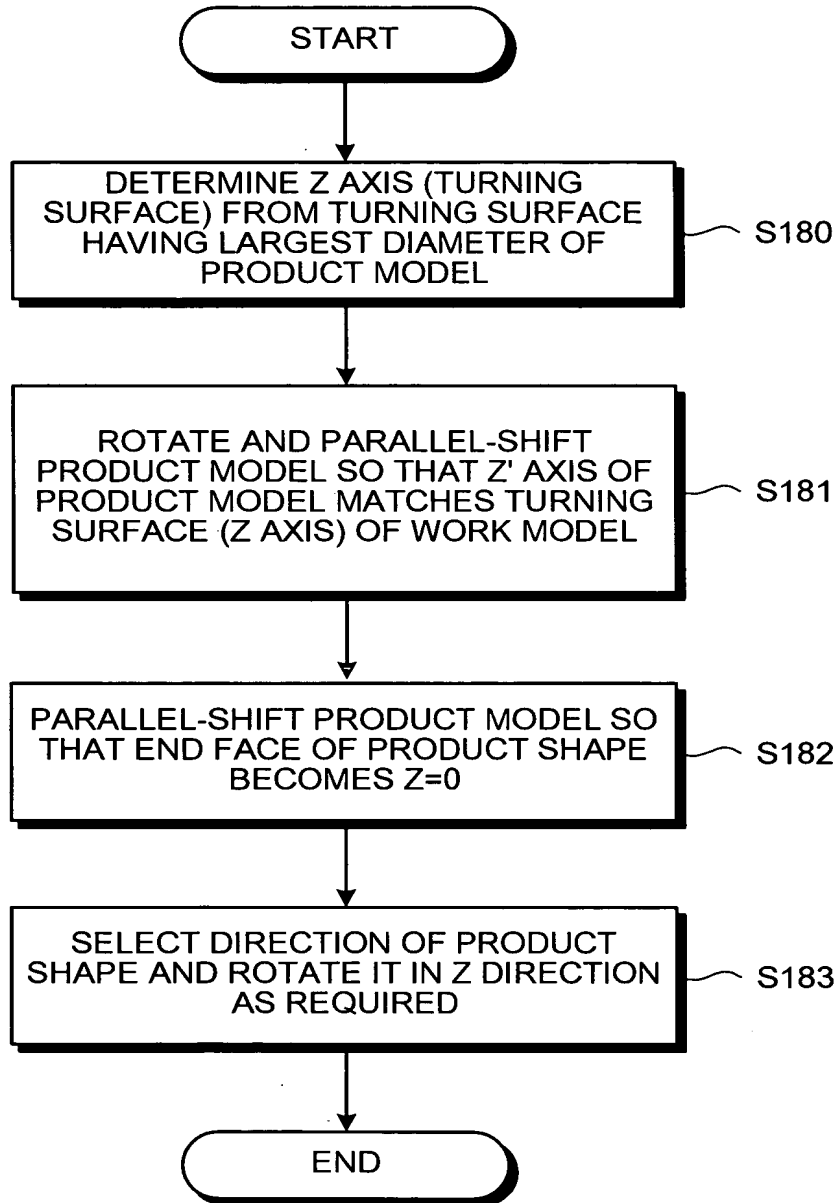


FIG.31



29/49

FIG.32



30/49

FIG.33

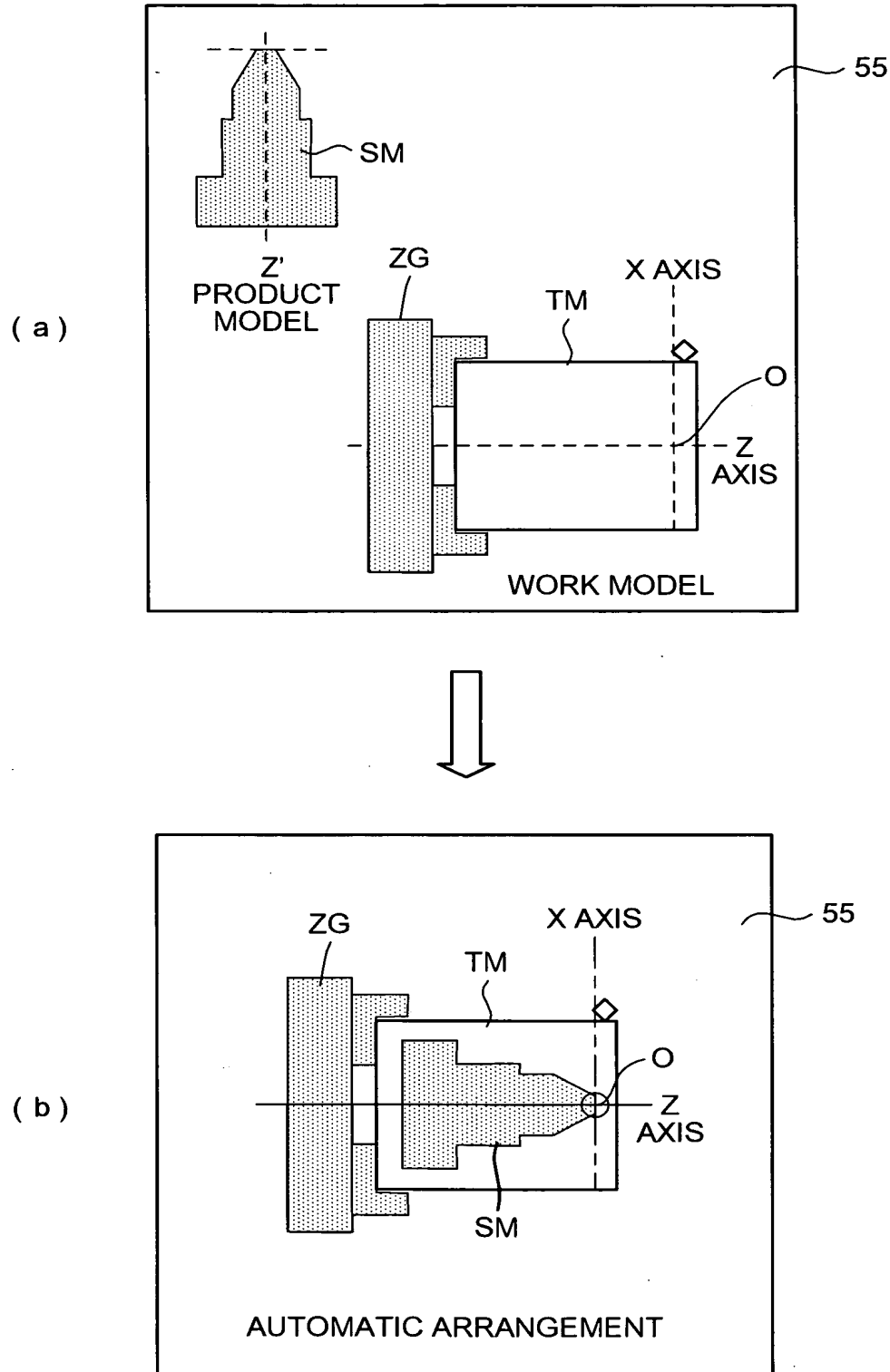


FIG.34A

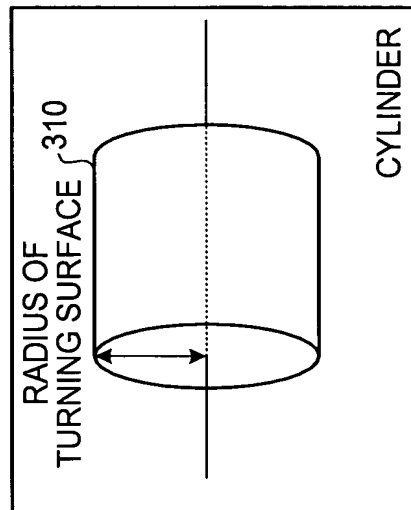


FIG.34B

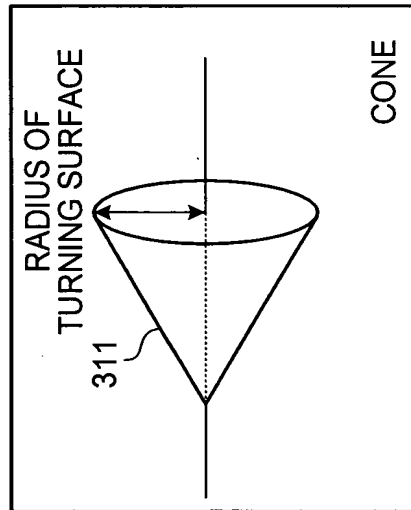


FIG.34E

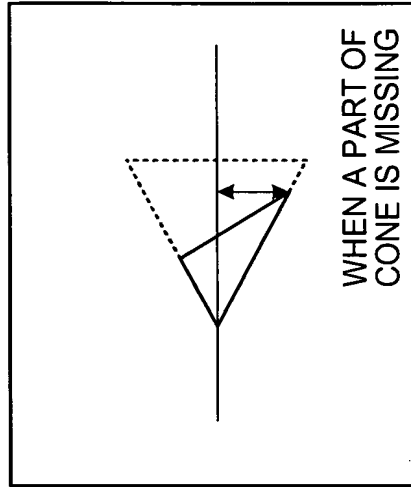


FIG.34C

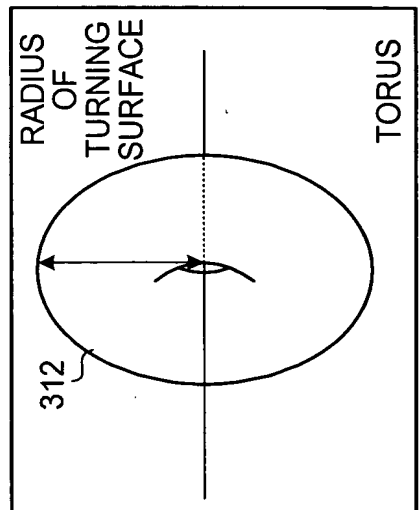
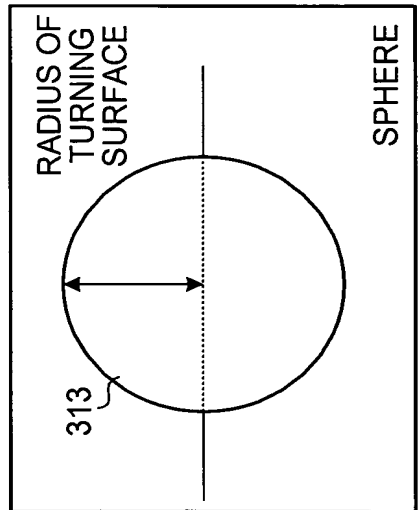


FIG.34D



32/49

FIG.35

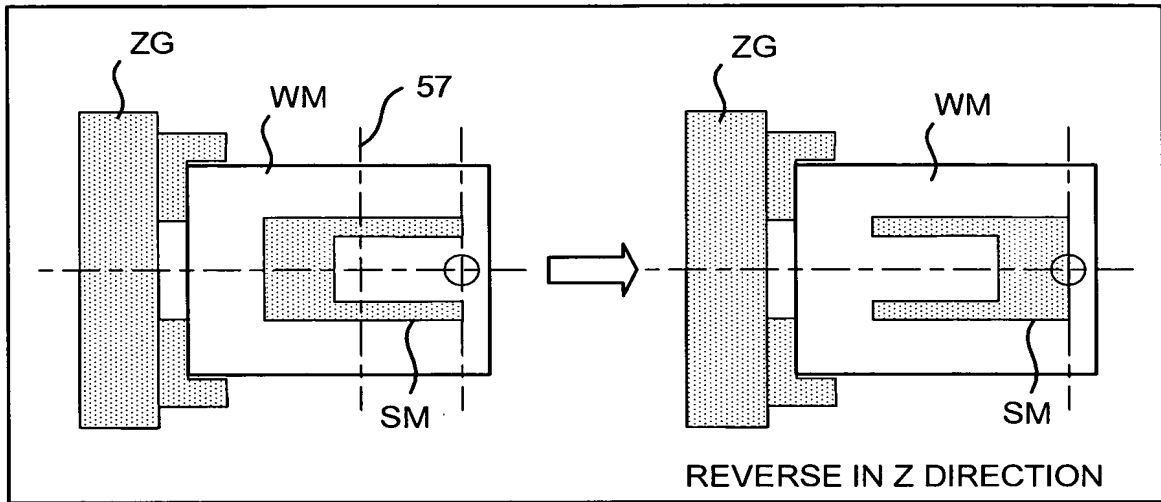


FIG.36

X-AXIS PARALLEL SHIFT	Y-AXIS PARALLEL SHIFT	Z-AXIS PARALLEL SHIFT		X-AXIS ROTATION	Y-AXIS ROTATION	Z-AXIS ROTATION		FINISH SHAPE SHIFT	
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FIG.37

SHAPE SHIFT

☒ PRODUCT SHAPE

☐ WORK SHAPE

☐ FIRST CHUCK SHAPE

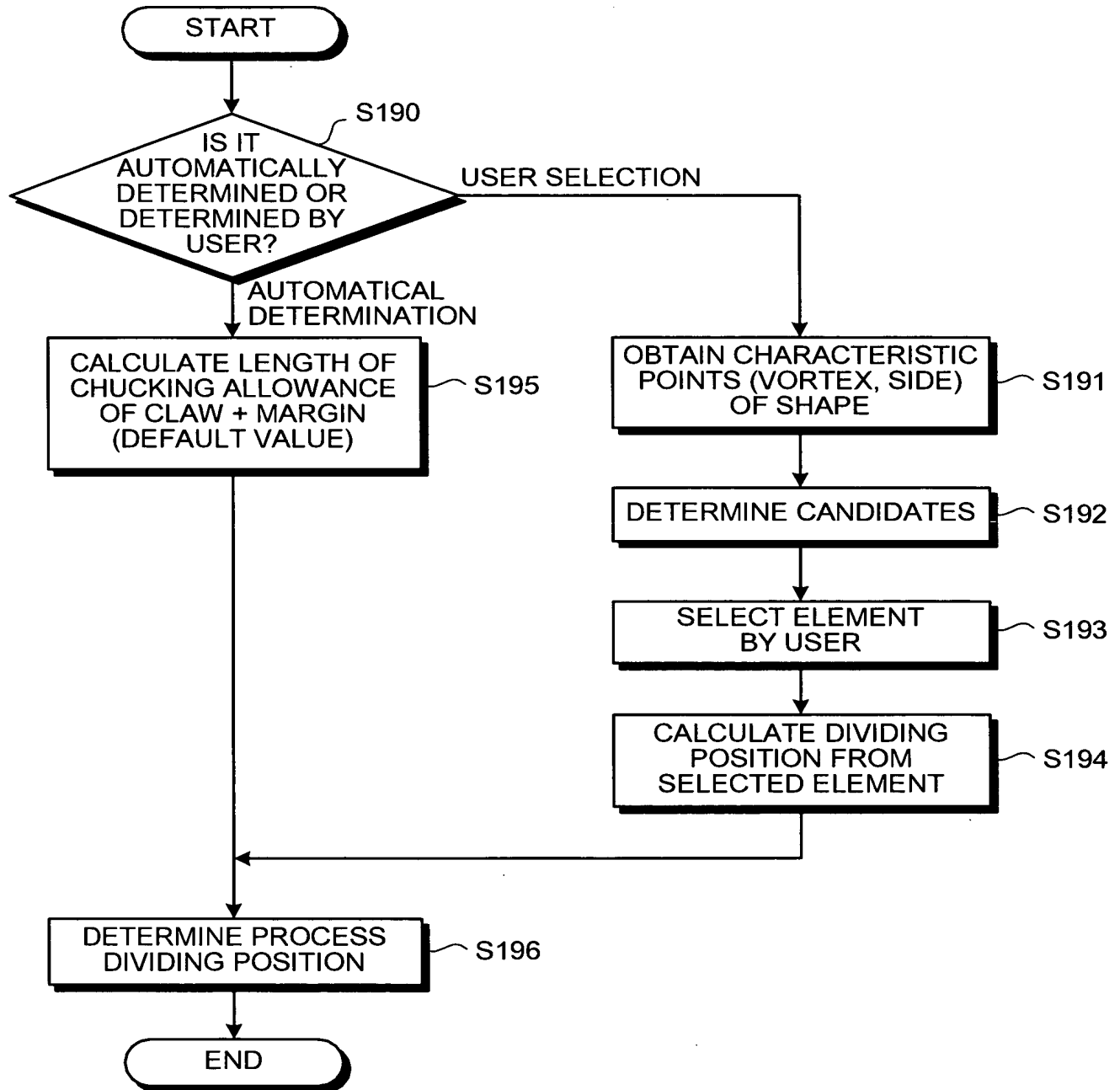
☐ SECOND CHUCK SHAPE

STEP AMOUNT 0

SHIFT AMOUNT 0

SHIFT

FIG.38



36/49

FIG.39

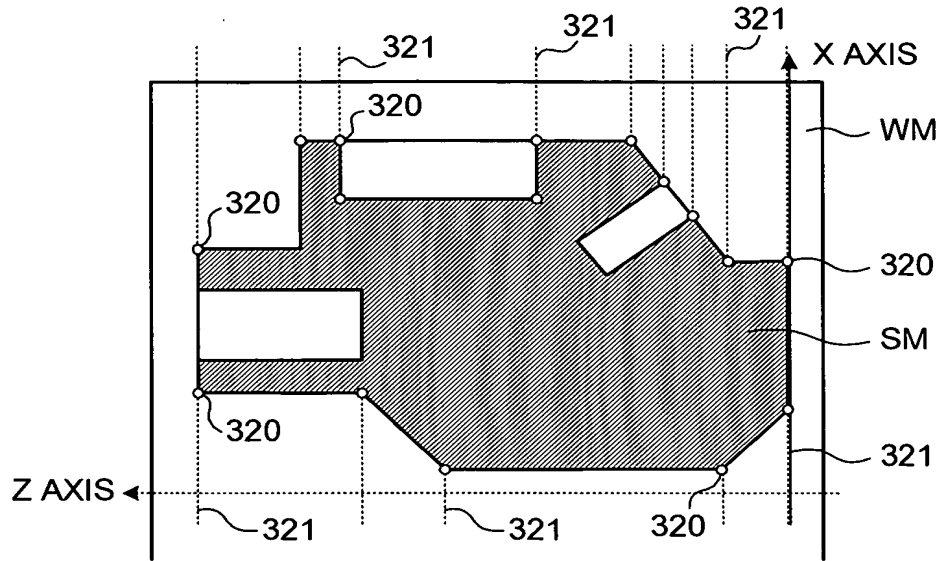


FIG.40

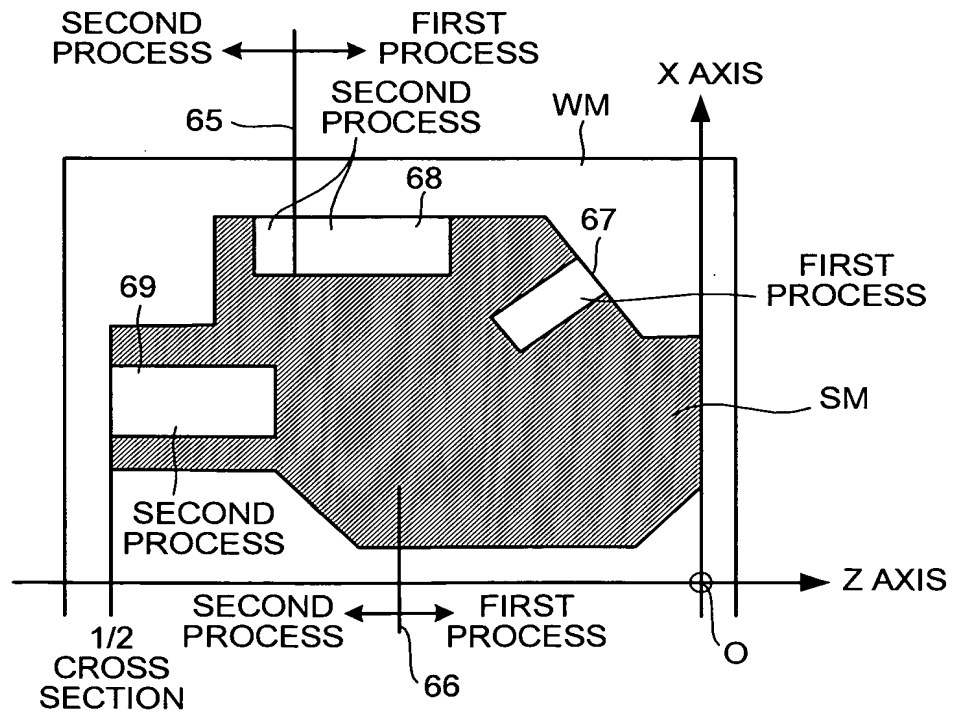


FIG.41

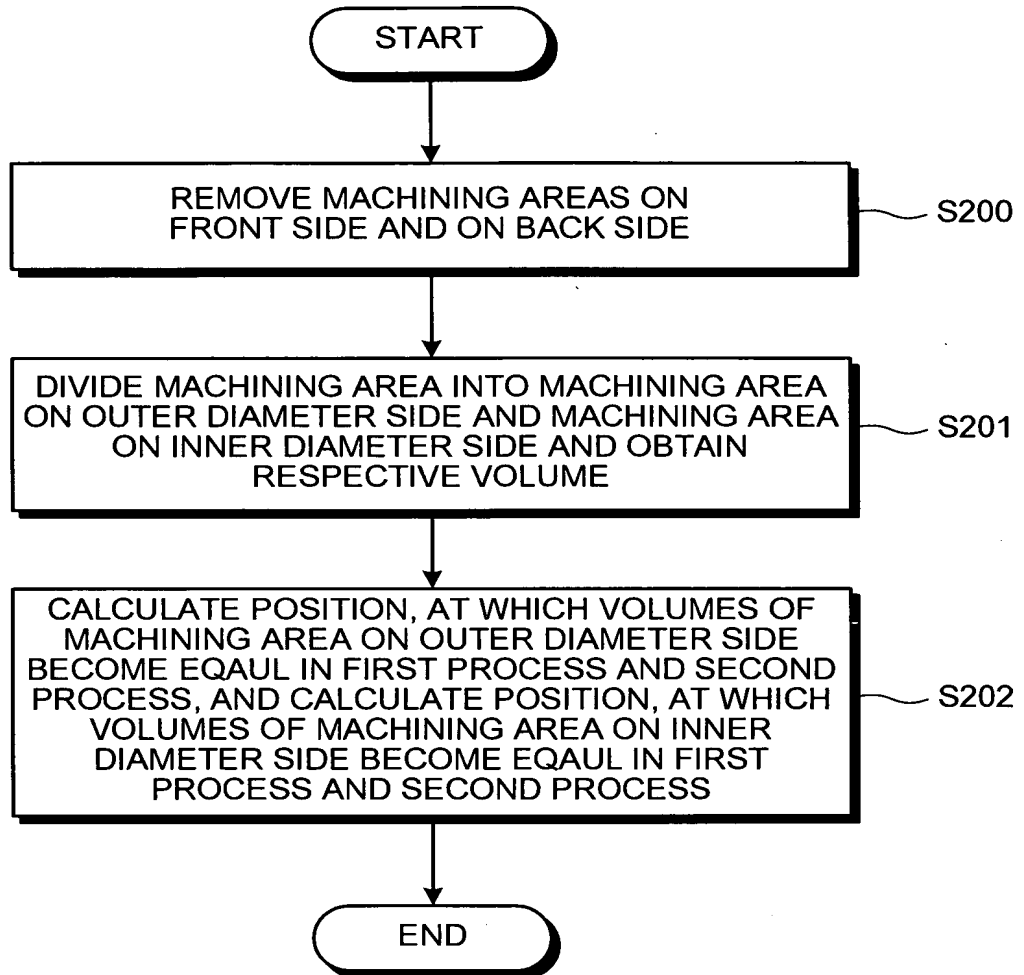


FIG. 42A

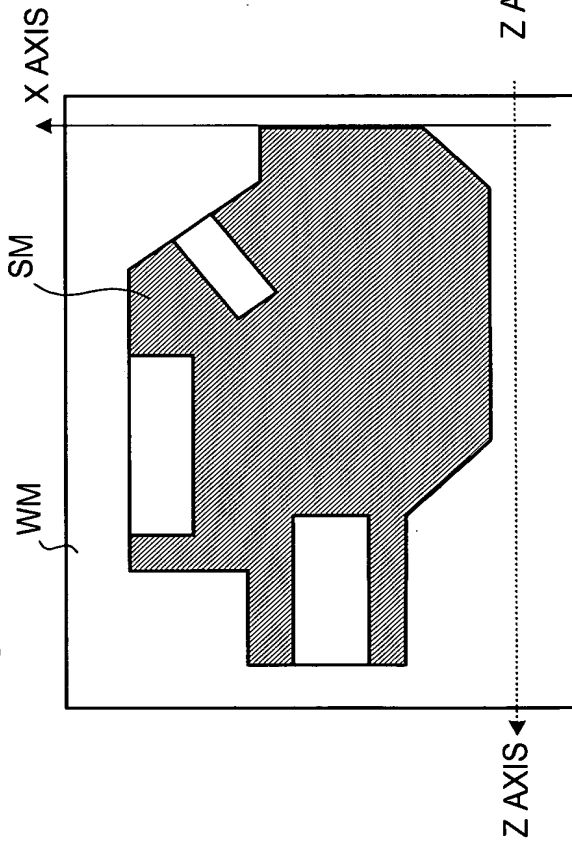


FIG. 42B

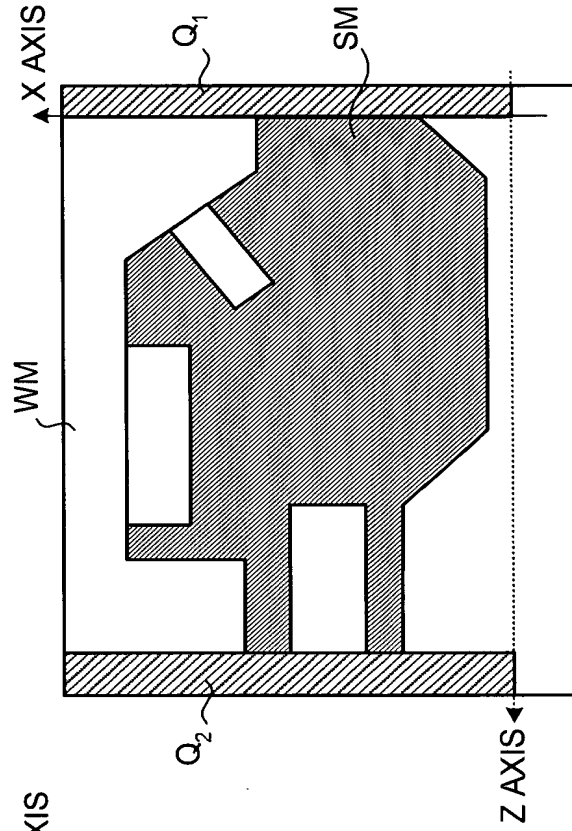


FIG. 42C

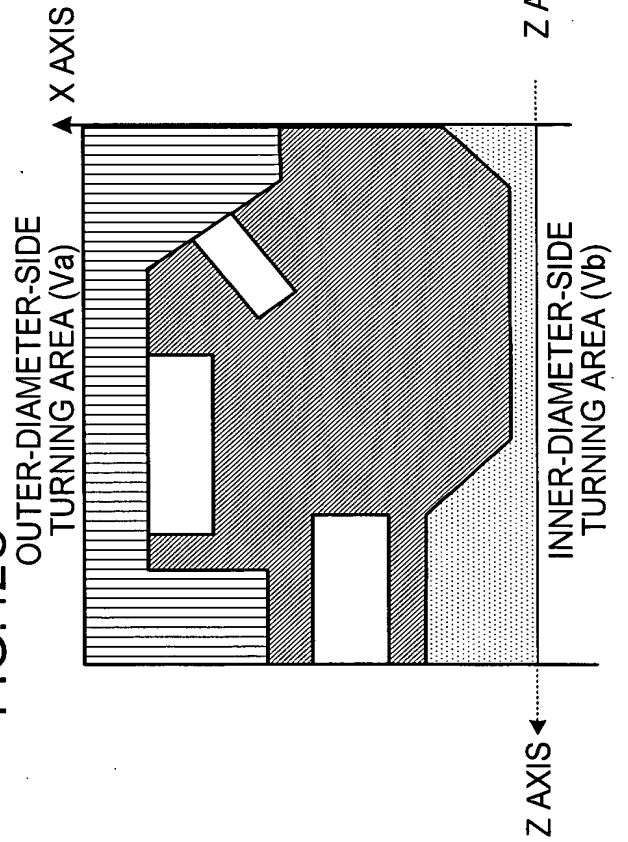


FIG. 42D

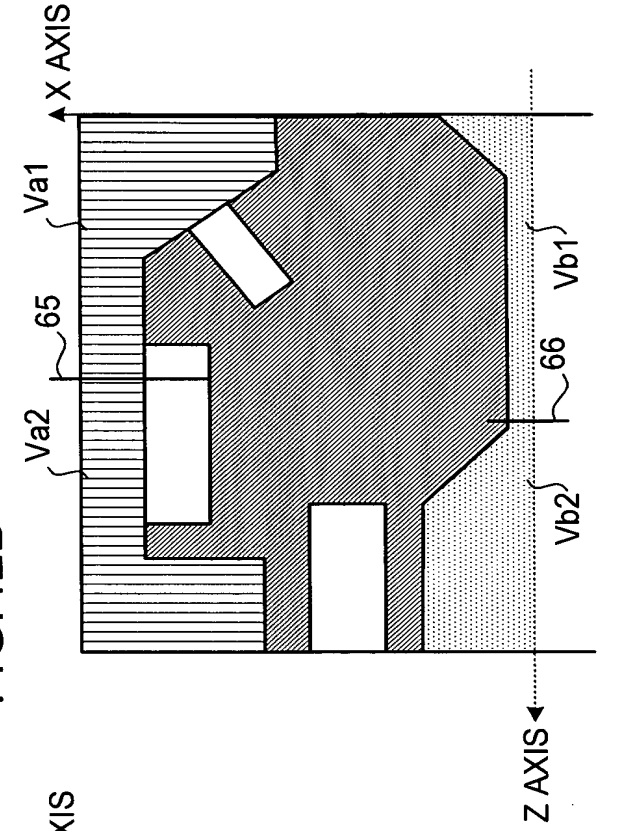


FIG.43

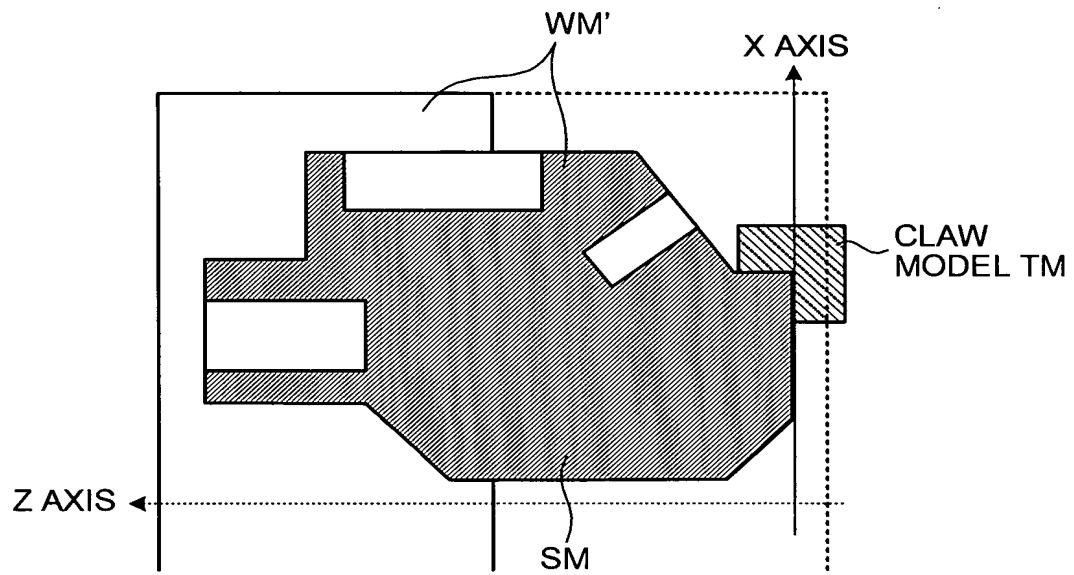


FIG.44A

FIG.44B

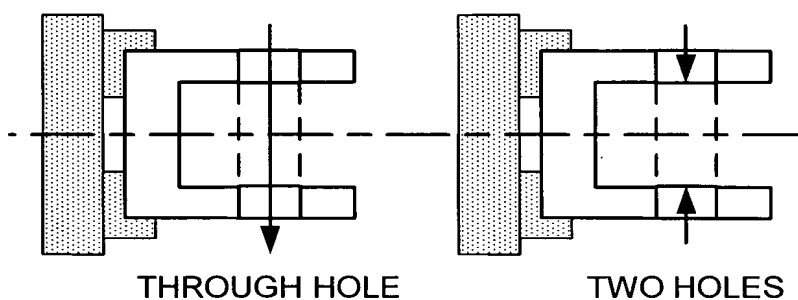


FIG.45

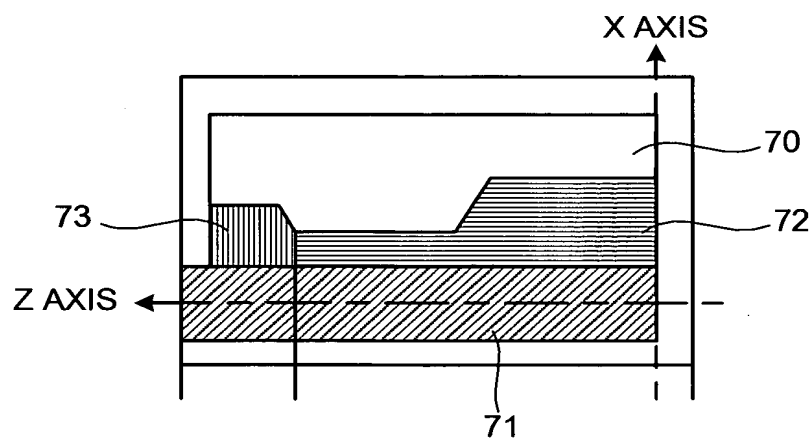


FIG.46

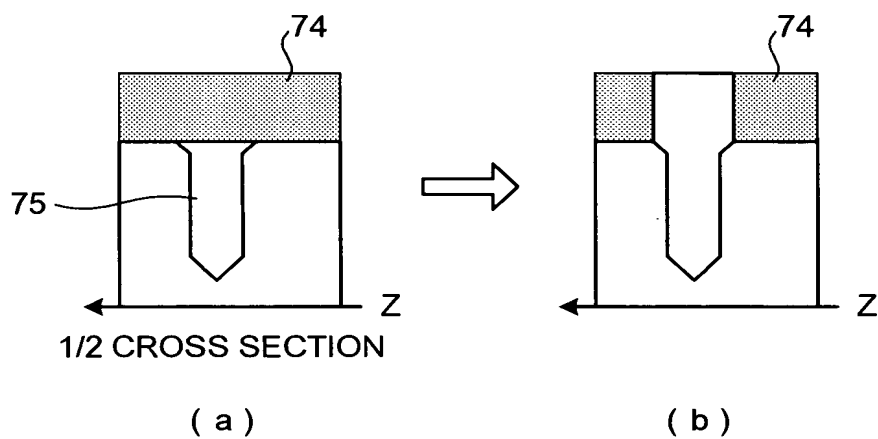


FIG.47

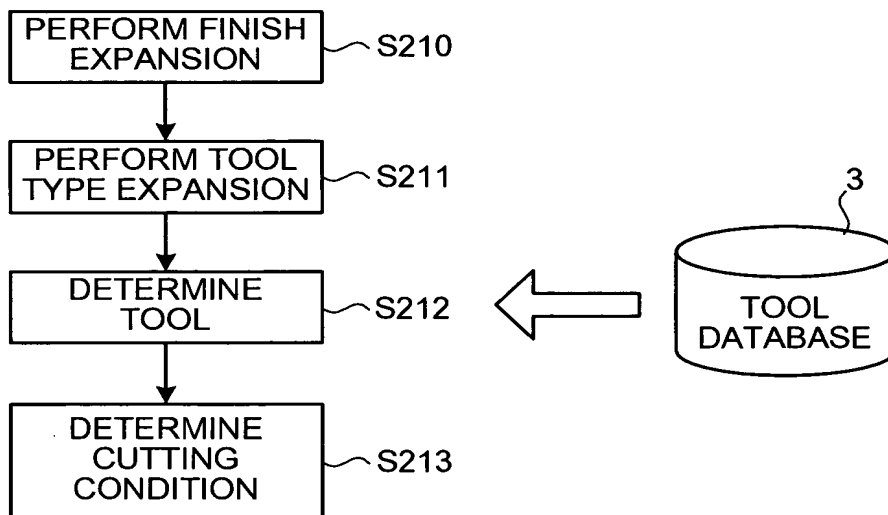
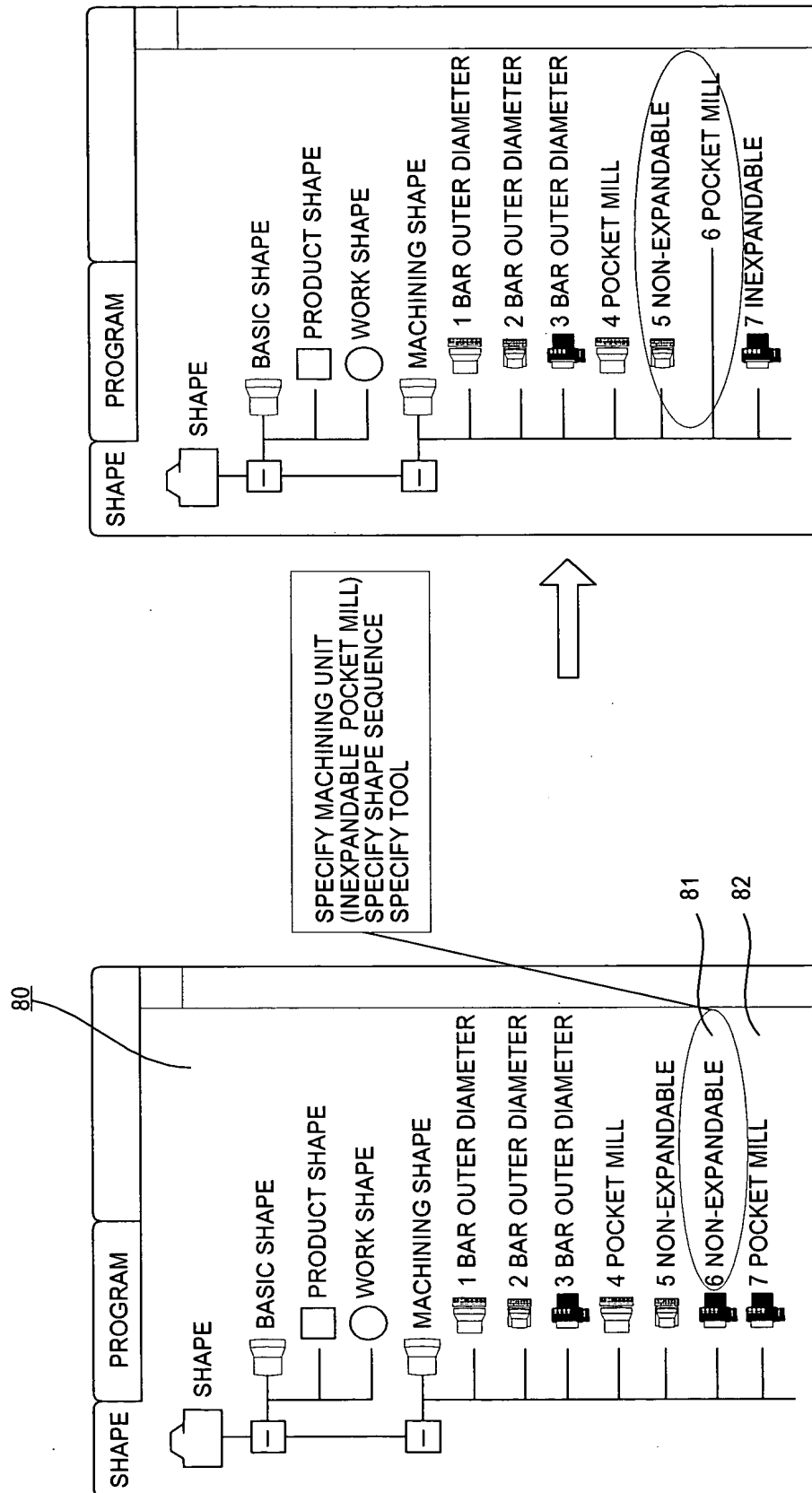


FIG.48



(b)

(a)

FIG.49

80
85
89
84

88
87
91

SHAPE
PROGRAM

PROGRAM

..... COMMON

..... 1 FACE MILL

..... **2 FACE MILL**

..... 3 FACE MILL

..... 4 FACE MILL

..... END

UNo.	UNIT	MODE	ANGLE B	POSITION C	MACHINING ALLOWANCE-A	BOTTOM	WALL	AMOUNT OF FINISH-A	AMOUNT OF FINISH-R
2	FACE	ZY	◆	90.	30.	1	◆	0.	◆
MILL									
SNo.	TOOL	NOMINAL DIAMETER	APPROACH 1	APPROACH 2	METHOD	AFD	NOTCH-A	NOTCH-R	PERIPHERAL SPEED
R 1 FACEMILL									
FIG	SHAPE	SURFACE SHIFT R	Z	Y	RADIUS R/Q	I	J	P	CORNER
1	LINE	10.	0.	10.					◆
2	LINE	◆	40.	10.					◆
3	LINE	◆	40.	-10.					◆
4	LINE	◆	0.	-10.					◆

UNo.	UNIT	MODE	ANGLE B	POSITION C	MACHINING ALLOWANCE-A	BOTTOM	WALL	AMOUNT OF FINISH-A	AMOUNT OF FINISH-R
3	FACE	ZY	◆	90.	30.	1	◆	0.	◆
MILL									
SNo.	TOOL	NOMINAL DIAMETER	APPROACH 1	APPROACH 2	METHOD	AFD	NOTCH-A	NOTCH-R	PERIPHERAL SPEED
R 1 FACEMILL									
FIG	SHAPE	SURFACE SHIFT R	Z	Y	RADIUS R/Q	I	J	P	CORNER
1	LINE	10.	0.	10.					◆
2	LINE	◆	40.	10.					◆
3	LINE	◆	40.	-10.					◆
4	LINE	◆	0.	-10.					◆

UNo.	UNIT	MODE	ANGLE B	POSITION C	MACHINING ALLOWANCE-A	BOTTOM	WALL	AMOUNT OF FINISH-A	AMOUNT OF FINISH-R
3	FACE	ZY	◆	90.	30.	1	◆	0.	◆
MILL									
SNo.	TOOL	NOMINAL DIAMETER	APPROACH 1	APPROACH 2	METHOD	AFD	NOTCH-A	NOTCH-R	PERIPHERAL SPEED

44/49

FIG.50

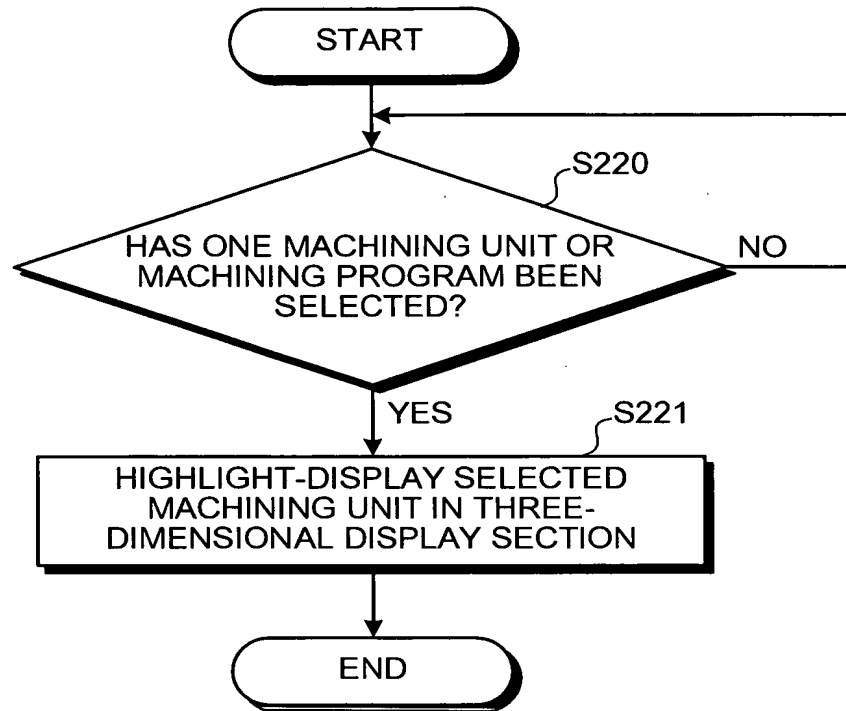


FIG.51A

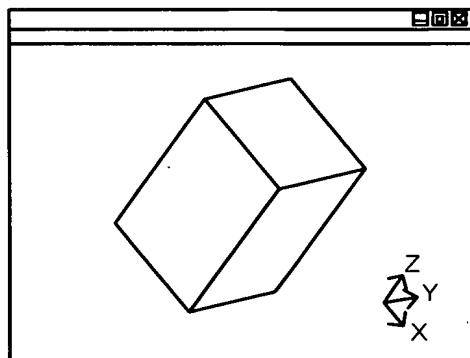


FIG.51B

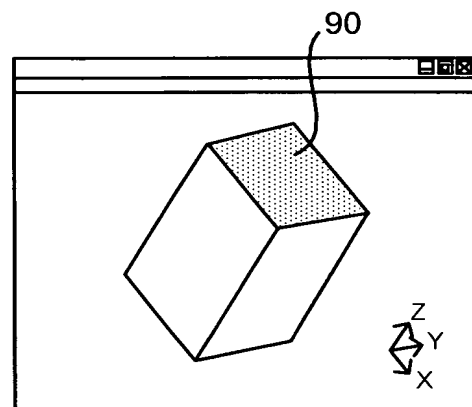
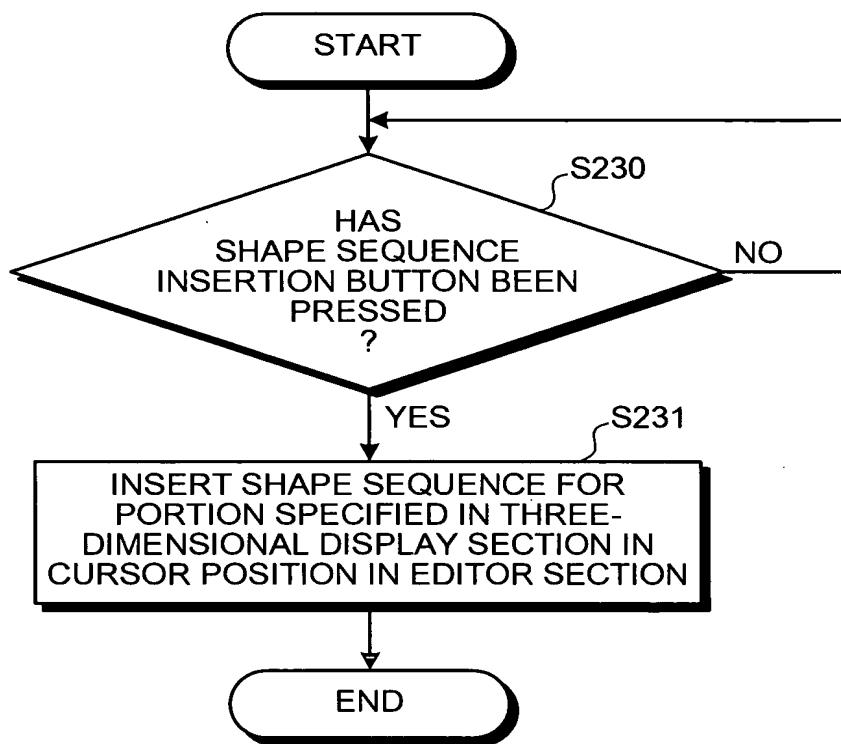


FIG.52

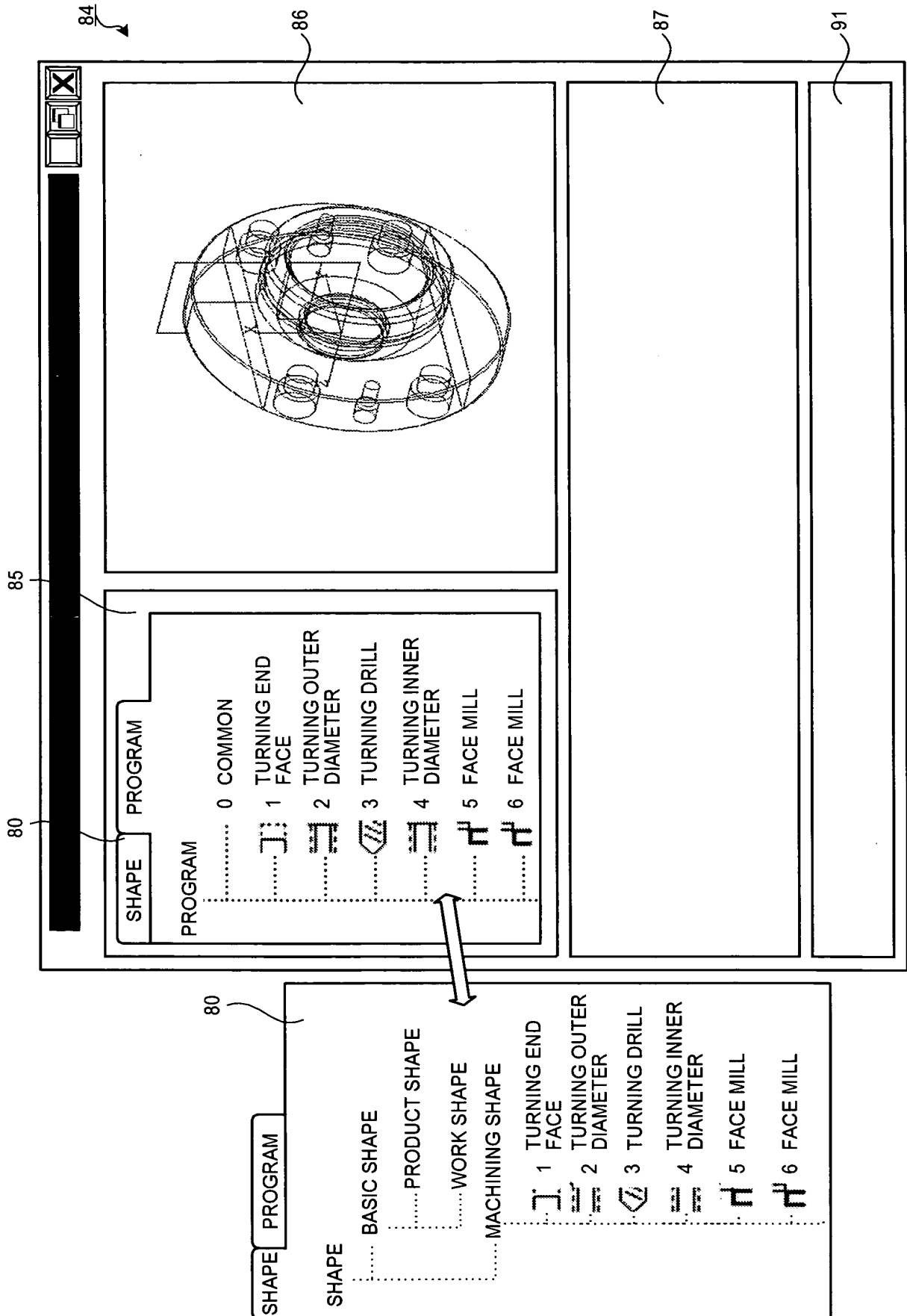


46/49

FIG.53

UNIT	MODE	INEXPANDABLE	Y	SURFACE SHIFT Z	SURFACE SHIFT R	X	Y	RADIUS R/	I	J	ANGLE B	ANGLE C
1	LINE	(SUPPORT)	0	0	0	18.487	-29.602				0	0
2	LINE		◆	◆	◆	18.487	-18.5				◆	◆
3	LINE		◆	◆	◆	-18.487	-18.5				◆	◆
4	LINE		◆	◆	◆	-18.487	-29.602				◆	◆
5	LINE		◆	◆	◆	18.487	-29.602				◆	◆

FIG. 54



48/49

FIG.55

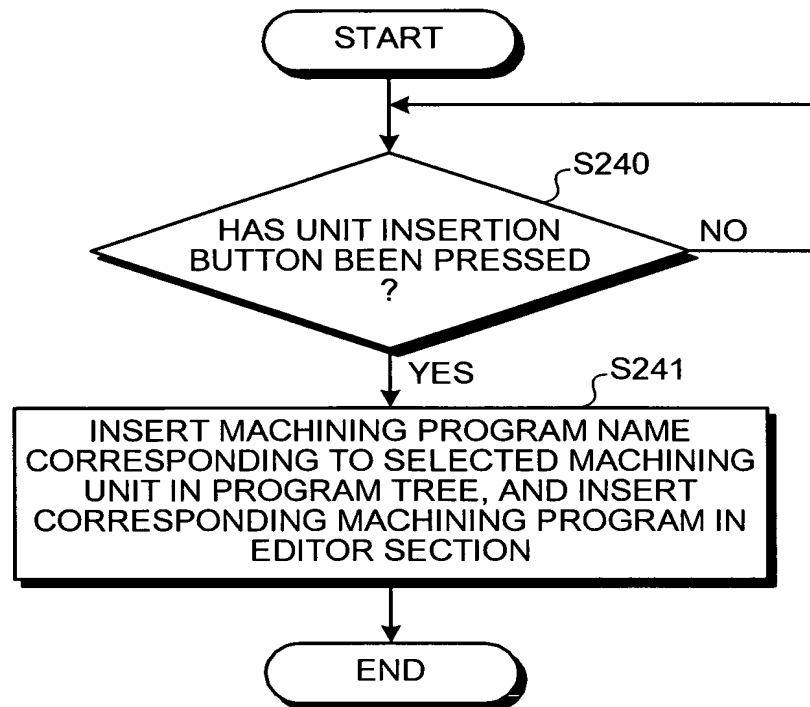


FIG.56

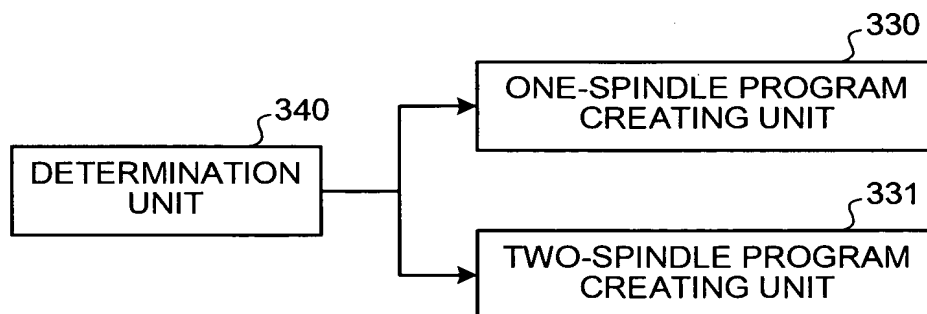


FIG.57

